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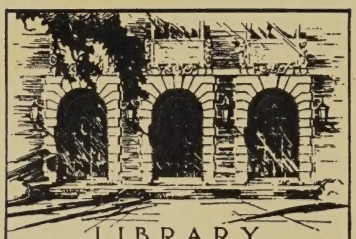

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A METHOD OF DIRECTING CHILDREN'S STUDY OF GEOGRAPHY

BY

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TEACHERS COLLEGE, COLUMBIA UNIVERSITY
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E. H. R.

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A METHOD OF DIRECTING CHILDREN'S STUDY OF GEOGRAPHY

CHAPTER I

PREVIOUS STUDIES IN THE TEACHING OF GEOGRAPHY

Geography in the elementary school, like any other subject in the program of studies, offers to the student of education a twofold opportunity for scientific investigation. On the one hand, there is the question of what should be taught, that is, the curriculum. To a large extent, the content of the elementary school course of study may be determined by discovering what items of geographical information are important to the average adult citizen, and several investigations of this type have been made. On the other hand, there is the question of how to teach this information. This field—the field of method—would seem to be at least as worthy of study as that of the curriculum. Although individual pieces of research must of necessity stress only one phase of the total teaching problem, yet an entire program of scientific inquiry which does not embrace questions concerning both curriculum and method is to that extent incomplete.

The present situation in the field of elementary geography represents just this one-sided development. Several curricular studies of importance have been published in the last ten years. In 1915 Bagley conducted a pioneer investigation to determine "minimum essentials in geography and history."[1] Samplings of several magazines over a period of seven years formed the basis for a count of references to different continents, countries and bodies of water. On the basis of this count, the relative importance of the items was determined. A similar study is reported by Charters,[2] the results of which are much like those of Bagley's investigation. Branom and Reavis[3] in 1918 used the values of imports and exports as the criterion of importance for countries of the world, and published a list of the different nations in order of their rank.

[1] *Fourteenth Yearbook, National Society for the Study of Education*, Part 1, pp. 131-39.
[2] Charters, W. W. *Curriculum Construction*, pp. 270-72. Macmillan, 1923.
[3] *Seventeenth Yearbook, National Society for the Study of Education*, Part 1, Chap. 3.

The most ambitious studies of this general type are those of Washburne,[4] and of Rugg and Hockett.[5] Whereas the former used only the frequency of mention of geographic locations in newspapers and magazines, the latter employed seventeen criteria as follows: 1) Bank clearings; 2) Foreign trade; 3) Population; 4) Area; 5) Relative number of magazine articles published from 1919 to 1923, dealing with various types of locations; 6) Frequency of use by frontier thinkers in critical treatises; 7) Frequency of use by writers in critical journals; 8) Washburne's study; 9) Statistics of freight tonnage handled at United States ports; 10) Value of total commerce of world ports; 11) Number of miles of railroad track operated; 12) Total of operating expenses and operating revenue; 13) Percentage of world's output of important minerals; 14) Amount of traffic carried over ocean lanes of trade; 15) Percentage of population engaged in manufacturing; 16) Areas of dense population; 17) Areas of production of agricultural goods.

There is no question as to the great value of these studies. The substitution of objective criteria for theory and opinion marks an important advance in the teaching of geography. But it should be noted that these are entirely curricular investigations. In no case does the classroom situation enter into them. The teacher knows better than formerly what geographical facts his pupils should learn; but he is still at a loss as to how they shall acquire the knowledge, for the field of method is deplorably barren of scientific work. Rugg has applied present-day knowledge of the learning process to the memorization of map locations, and to that extent has suggested a technique of teaching. He does not, however, report any experiment in which this technique has been put to scientific test. Courtis has made a study[6] of the effect of supervision on the learning of geographical locations as determined by his geography tests, but he does not discuss the changes in classroom method which supervision effected and which improved the children's scores. One searches in vain the pages of journals of education for reports of controlled experiments in teaching method in geography.

Although there has been an advance in general educational method in the last few decades, it does not seem safe to assume

[4] *Twenty-Second Yearbook, National Society for the Study of Education*, pp. 216-33.
[5] Rugg, Harold and Hockett, John. *Objective Studies of Map Locations.* The Lincoln School of Teachers College, Columbia University, 1925.
[6] *School and Society*, November, 1919.

for this reason that correct teaching techniques in geography will take care of themselves when once the content has been established. In other subjects of the elementary school curriculum, method has received much attention. The teaching of arithmetic, of spelling, of penmanship and of reading, for instance, has been subjected to numerous controlled experiments by which classroom procedure has been modified and improved. Moreover, it is well recognized that the average teacher has great difficulty in applying a general principle to a specific situation. That children should take a problem-solving attitude in the study of their geography lessons, for example, is a principle generally accepted by theorists in the field of method; but the average teacher is at a loss when, in assigning a lesson in the geography of a country, she wishes her pupils to apply the principle in action. On the student of education, therefore, lies the burden of translating a modern philosophy of education into such teaching techniques as will be intelligible and practicable to the average teacher.

CHAPTER II

TEACHING PROBLEMS PERTINENT TO THIS INVESTIGATION

The object of the present investigation is to search for a technique which will improve the pupils' method of studying the geography textbook in the upper grades of the elementary school. While there has recently been a somewhat pronounced movement against a too slavish adherence to textbooks, yet teachers recognize their value if properly used. Under almost any teaching method, the reading of assignments in the basal text plays some part in connection with a given unit of subject matter. Any technique, therefore, which will improve such reading will be of assistance to teachers of geography.

For some time objectively scorable questions have been used to determine the quality of silent reading. Silent reading tests, however, have not been employed, except incidentally, as a means of teaching. It appeared to the writer that the systematic use of such questions in connection with the reading of a text might improve the quality of study in geography, and the present investigation was undertaken to determine the truth or falsity of this theory.

For the purposes of this investigation, two geography textbooks were used, namely *Advanced Geography* by McMurry and Parkins, and *Human Geography* by J. Russell Smith.

Objectively scorable study questions on portions of these books were made by the experimenter, and in general the experimental procedure was to assign these parts of the texts to two groups of pupils; giving the questions to one group, and simply requiring the other group to study the same subject matter. In both cases the same true-false test was used to determine the efficiency of the pupils' work from the standpoint of what facts were learned.

The proponent of any new technique in the field of teaching method has a double duty to perform. He must, of course, show by scientific means that his method will work: that it will do what he claims for it. To show this conclusively it is obligatory

that he use the procedure of a controlled experiment and that he test his data by established measures of reliability.

His second duty, however, cannot be so scientifically discharged. In order to eliminate variables and to reduce a problem to a workable unit, it is necessary that only a small fraction of the total teaching process in any subject be put to the test. That is to say, the complete teaching method in geography is like a completed edifice built up of many individual stones, each stone representing one unit of the total structure. Ideally, each stone would have been put to scientific test and its worth thus established. In any subject at the present time, however, the teaching edifice represents a mixture composed of some stones which have been objectively determined and others which have been subjectively hewn by the tools of philosophical ideals, professional experience, logic or sound common sense. Of the latter sort are most of the stones in the geography building.

However much this situation may be deplored, it must be accepted at the present time; and the experimenter must show not only that his technique will work, but also that it fits reasonably well into the teaching edifice already in use. His only alternative is to tear down the entire building and reconstruct it about his one experimentally determined stone. If he does this, his chances of being right may be greater—possibly—but his new structure is likely to fall into decay unnoticed; for the teaching profession must welcome new ways of work or else those new ways are doomed to oblivion.

The value of the new technique then, from the standpoint of whether it does what it is expected to do, may be determined objectively; but its worth as a part of the teaching method as a whole is more nearly a question of judgment. Such worth, however, should not for that reason be ignored, and the purpose of the present chapter is to present a statement, based on reason and analogy, of the use of objectively scorable study questions in the teaching of geography.

The study questions used in this investigation constitute a form of lesson assignment. The writer recognizes fully the fact that the subject of lesson assignments is a moot point among educational theorists. But the question may well be raised as to whether some of this disagreement may not be due to a failure to recognize various types of assignments. No one would think

of asserting that food builds fat or that food builds bone, without specifying *which* kind of food is meant. Since the reaction hypothesis indicates that the mind is not a unified entity but a complex mass of individually developed bonds, it follows first that different kinds of assignments will produce different varieties of mental growth; and second that the well-rounded student is the one who is trained through several types of assignments to a flexibility of attack on subject matter.

Whether or not this point of view be recognized in principle, it is in fact in most progressive classrooms. In geography there are assignments which call for map drawing, for study of questions, for reading to report to the class, for reading required for a recitation period, for making graphs and charts, for preparing a debate, for giving a stereopticon lesson, and so forth. Each of these requires in its preparation a different emphasis from all of the others. Assignments will vary also according to the kind of method which a teacher is using. An assignment by a teacher who is using the problem method of attack may not be the same as that by a teacher who is using a type-study method.

At first thought then, a contribution to the problem of lesson assignments in general would appear to be well-nigh impossible. But running through all of these different approaches to subject matter is an element which at one time constituted the only kind of assignment, namely a careful reading of the textbook. Whether it comes at the beginning of the study of a given topic or at the and; whether it precedes or follows the determination and acceptance of a problem; whether it is a topical or a page-to-page procedure, the careful reading of the text somewhere occurs in the teaching process in a given unit of work. If this be admitted, then it must be self-evident that any means of improving this reading is a contribution to teaching method in geography, whatever that method may be.

The objective scorability of the study questions under discussion gives rise to another sort of value in connection with the general problem of lesson assignments. This value is based upon the psychological law of effect. As stated by Gates,[1] this law is as follows:

"The individual tends to repeat and learn quickly those reactions which are accompanied or followed by a satisfying state

[1] Gates, A. I. *Psychology for Students of Education*, p. 230. Macmillan, 1923.

of affairs. The individual tends not to repeat or learn quickly those reactions which are accompanied or followed by an annoying state of affairs."

The purpose of assignments is to produce mental activity which results in learning. An application of the law of effect therefore would demand that a teacher attach satisfaction to those responses in the lesson assignment which are correct or desirable, and annoyance to those which are incorrect or undesirable. Teachers have done this in the past in two ways—through questions in class and through examinations. But these two ways appear inadequate to the writer when compared to the amount of learning which the lesson assignments are expected to produce.

First, let us examine class questions as a means of exercising the law of effect. For public schools, forty pupils is a representative number for a class, and thirty minutes for a lesson period. If the teacher tries to test each member of the class in this period, in order to attach satisfaction or annoyance to the responses, she may ask each pupil one question and receive his response. In this case, she has asked forty questions, at intervals of forty-five seconds. While forty-five seconds might allow for a reasonably important unit of subject matter for the individual question, yet every child is tested on only one point of the total lesson. If the teacher asks two questions per pupil, she must ask one question every twenty-two and one-half seconds. This means that the questions will have to become more specific, and cover a less important unit of subject matter. Still each pupil is tested on only a small fraction of the lesson; satisfaction or annoyance has been attached to but two responses. If each pupil is asked three questions, the time for each question is diminished to seven and one-half seconds, and four questions brings the length of the individual question and response to five and five-eighths seconds. Only trivial or purely factual material is likely to be covered where so small a unit of time is available for question and answer. And yet even if four questions per pupil are asked, each child would be tested on but a very small part of the total assignment.

The writer realizes that in imagining the hypothetical recitation periods above, he is creating an entirely artificial situation which would not prevail in any actual classroom. But the calculations do show that the recitation period as a means of testing adequately

the result of an assignment in geography and of providing successfully for the law of effect is doomed to failure.

What happens in actual practice is that a few pupils—and they are usually the brighter ones who need it the least—are most lively in class discussion, while some pupils may escape with practically no participation at all. Day after day may go by with little or no application of the law of effect in the study of their geography lessons.

Another factor is of importance in this connection. For some time educators have been dissatisfied with the whole conception of the recitation as a testing period. In 1909, Professor McMurry urged that the recitation period be made a thinking rather than a testing period.[2] This ideal has found general acceptance among educational theorists. Not only, then, is the recitation period unsatisfactory as a testing period, but to use it as such is out of harmony with the best educational thought of the day.

Do examinations supply the necessary satisfaction for well prepared lessons or annoyance for poorly prepared ones? In a measure, they do. But the use of class periods for examination purposes curtails to that degree the time for class discussion and group thinking. If the examinations are held only at long intervals, they are likely to operate unsatisfactorily as motivation for the daily preparation of lessons, for it is a generally accepted principle of psychology that a stimulus, to be effective with children, must be immediate rather than remote.

Some other means, then, than the recitation period or examinations should be found in geography to supply the daily requirements of the law of effect in the preparation of assignments. In this respect, geography lags behind several of the other subjects in the elementary school curriculum. Assignments in arithmetic, for example, usually consist of problems which illustrate the principles discussed in class. Through the activities of the recitation period or through answer books, children ascertain exactly how effectively they executed the assignment, because they know how many problems they solved correctly. Satisfaction is thereby attached to correct methods of work which result in right answers.

For a long time the law of effect has been operative in the teaching of spelling. Going to the foot of the class on missing a

[2] McMurry, F. M. *How to Study*, p. 81. Houghton, Mifflin, 1909.

word in the days when spelling classes "toed the crack" and spelled orally was a means of attaching annoyance to wrong responses; while the pupil who held the position of head of the spelling class against all the others experienced daily the attachment of satisfaction to correct responses. Although the *modus operandi* of the spelling lesson today has changed in many respects, yet frequent if not daily tests, and class and individual scores and graphs of progress still apply the law of effect.

The penmanship scale has made the same sort of work possible also in the teaching of handwriting. In Detroit, for instance, each child knows exactly what the required norm for his grade is, both in quality and in speed. His daily practice very frequently ends in a test, in which he writes a sample to show his best speed and quality. He then counts the letters himself, enters the number in a record book, grades the quality of his work on the penmanship scale, and enters that also. He then compares these marks with the norms for his grade. Whether he is above or below these norms, the fact of objective scores makes the law of effect operative. How much more likely is this procedure to produce a satisfying or annoying state of affairs than that under which most of us learned to write, when a copy was set before us and we were told to write "the very best we could"!

There is probably another value to the objectively scorable study questions in that they appeal to the universal interest in puzzles. This appeal probably has its roots in what Thorndike calls "the general enjoyment of success rather than failure in an enterprise to which one has set oneself." In another place he calls it "the interest in achievement" and states that it "is stronger in children than is often realized." [3] They like to overcome difficulties or to solve problems, but in order to appeal to this interest, an exercise should possess certain characteristics. It must not be too hard or else the children will become discouraged and lose interest in an enterprise in which they think failure is certain. On the other hand, it must not be too easy, for then there is no great satisfaction in accomplishment. The problem must not require too long a time for its solution, as children lose interest in issues which are not sharply defined and briefly settled. Probably much of the problem study in geography falls short at this point; the teacher may see clearly the conclusion of the work on a

[3] Thorndike, E. L. *Psychology of Arithmetic*, p. 197. Rand, McNally, 1921.

unit of subject matter but children are likely to be lost in the mass of detail necessary to reach it.

Finally, the fact of success or failure must not be left in doubt or uncertainty; pupils must *know* whether or not they have satisfactorily accomplished their tasks, or reached their goals in an activity which they have undertaken.

Such are the characteristics of those activities which enlist the eager attention of children and frequently of adults. The craze in the last few months for the cross-word puzzle is a case in point; while the long-established popularity of puzzle departments in newspapers and periodicals, of guessing games, charades and the like, gives further evidence of the universality of the interest under discussion.

In the teaching of geography in the past, little appeal has been made to this tendency, except, as stated above, through questions in class and through examinations. The objectively scorable study questions, however, utilize it, not on a small fraction of the assignment as in the case of class questioning, but on all of the major points of the lesson; not at infrequent intervals as in the case of examinations, but in the work of every day when textbook study is part of the assignment.

In recent years, much enthusiasm has been shown both by teachers and by educational theorists for the approach to geographical material through the problem method. Under this method, the unit of study and teaching, instead of being a topic or a certain number of pages, consists of a problem which appeals to the children's interests and the solution of which involves the study of a worthwhile unit of subject matter. For example, a class in the Horace Mann School recently approached the topic "Alaska" through this problem: "Did the United States make a wise investment when she purchased Alaska?"

Of the problem method of treatment, Professor McMurry says:

"The crying need in geography in recent years has been to get away from the encyclopedic presentation of facts. The encyclopedic treatment makes a list of topics, such as location, surface features, climate, products, etc.,—the centers of attention, and offers under each heading whatever facts the specialist in the field thinks valuable. It largely ignores the relative value of facts and their bearing on the child. Its point of view is that of the well informed scientist who imposes upon the learner whatever facts the latter's distant future good may seem to require.

"In contrast, modern educational theory makes the learner's present

interests and needs the starting point in instruction. It demands that, in a field like geography, those problems which have general value and which are so intimately related to the child as to promise to make a strong appeal to him be first sought out. Then the facts necessary for their solution should be offered.

"Good study, or good thinking requires first that live questions be raised for consideration; then that facts be collected, evaluated and organized until forceful and valuable conclusions be reached. That is what all efficient people in active life do when they 'think'; and one of the chief duties of the school is to accustom children to that procedure." [4]

Some time ago the writer taught a class in fifth grade geography over a period of several weeks in order to ascertain what are the greatest difficulties with the problem method of teaching geography. From this experience he reached the conclusion, since confirmed by many conversations with geography teachers, that two of the most difficult questions to answer in using this method are: (1) By what method and at what time in the teaching process on a given unit of subject matter should a study problem arise?; and (2) How may essential facts be acquired without too much rambling discussion and loss of time?

The first of these questions is particularly troublesome. The writer does not presume to state that he has found in the objectively scorable study questions the best solution to it; for various sorts of solutions have yet to be put to the test of scientific investigation. But he believes that he has found one solution which is at least worthy of consideration by teachers who are struggling with this difficulty.

Heretofore many teachers have acted on the theory that since the study problem is the unifying force around which subject matter is organized, therefore the selection of the problem should occur at the beginning of the work on a given topic. For instance, the first assignment on the Argentine Republic in a fifth-grade class was, "Look at the maps and pictures and go through Argentina in McMurry's geography and write five questions that are suggested by what you read, by maps and pictures, by what is interesting and what is big. Cross your biggest question and be able to prove that your crossed question is a good question." [5]

Of late, some objections have been raised to the theory that the problem is the starting point of work on a portion of geography.

[4] McMurry, F. M. and Parkins, A. E. *Advanced Geography.* Preface. Macmillan, 1921
[5] *Stenographic Reports of Lessons*, p. 40. Teachers College Bureau of Publications, 1924

Mr. Stull, associate in geography at Teachers College, Columbia University, has stated in class that children at the beginning of their study of a country do not have a sufficiently wide factual background to enable them to select problems intelligently. In discussing the same subject recently, both Professors McMurry and Hillegas have made the same sort of statements, giving as their opinion that it is likely that a problem of real value can be discovered and stated only after a careful preliminary study of a subject. If then, line A—B represents the total amount of time

A C D E B

spent on Argentina, for instance, the problem, instead of being formulated at C might better be formulated at D or E. The whole question is, of course, still in the realm of speculation; the optimum time for the selection of the problem for study presents a fertile field for experimental work. Although the present inquiry cannot hope to answer the question, it can offer help to teachers who agree with the authorities quoted above, by giving them a method of attacking the textbook before the selection of the study problem; a method which is psychologically sound, which appeals to fundamental tendencies and which is effective in producing more accurate and careful silent reading than did the old method of telling children to "study their books."

We come now to the second difficulty in the technique of problem study, namely, that of securing the acquisition of essential facts without too much loss of time and rambling discussion. In order to make this issue perfectly clear, a copy of a stenographic report of a lesson in geography is given for analysis.

Who can state clearly to our visitors this morning what we are doing—something about the work we are doing?

Well, we are studying the New England States. We were trying to answer the question: Why do they manufacture so many . . . so much material when they haven't got the material to manufacture?

Yes—and before we could answer that question, what did we feel we had to know?

Different ones are making reports from different books on different things, wool, leather and lumber, and. . . .

In other words, we are trying to get an idea of how great a manufacturing center it is; and today, boys and girls have looked up the different kinds of manufacturing that are done in New England and are going to try to get some idea of the amount and different kinds.

Who is ready to report? All right, James.

Well, my report is on fishing in New England. (Reads from written report) Gloucester is the greatest fishing center in the world. Fishing is a dangerous occupation. . . .

Excuse me just a minute for interrupting, James, will you? Please open your books to the map so that you can locate these places as he mentions them.

The fishing in Gloucester is especially dangerous. The men go out to Newfoundland, and the two currents, the Gulf Stream and the Labrador, form a part. The Gulf Stream current is very quiet and warm compared to the Labrador current, which comes from the Arctic Ocean; and these men will go out in boats called "dories" to take the fish from the trawls. They will be out and pretty soon a fog will form and lots of them go down at sea. Sometimes they get found by schooners but lots of times they don't. In olden days before they did fishing on such a big scale the men went out in their dories and fished by themselves; and now they go out in schooners with nets and lines about a mile long and fish. And the land . . . when a person's land runs right down to the water, for three miles out it belongs to them and out farther it belongs to the world. And on Decoration Day when they decorate the graves—I mean instead of decorating the graves, they strew flowers all over the water. Lots of times when you go on a visit to Gloucester there will be a crowd gathered, and that means . . . it shows that something unusual has happened. Usually, it is a fishing vessel has come in. And in this crowd you will see lots of women dressed in black, in mourning because their husbands or fathers have gone down, or their older brothers, who are old enough to go out and fish.

These banks are very good fishing places because they are really plains. They go under the water for about nine feet; and the little fish come up there, and the cod and mackerel come up and feed on these fish.

The way they get the cod—they anchor the schooner and all that are left on the schooner are just the cook and the engineer who trims the sails because they have sails in the newer vessels and little gasoline engines to help them along when there is not much wind. And they're used too when it is too swift and they want to slow the vessel down. They go out in their boat—a boat that belongs to the schooner and have lines about a mile long and have them all hooked up with corks and lines. They anchor one end of the line to one mast and the other to another. They have several of these lines and they go later to get them. And then there is just a mass of fish; all over the deck is about waist deep in cod. And then they shovel them on to ladders. They cut off their heads and split them from their neck to tail and throw them to a man who puts them in salt water. And not one man can go to bed until all are cleaned and dressed. Then they put salt on the trays and put the fish in the salt and rub them around until they are well salted and dress them and put them in barrels.

And with the mackerel they go out in boats with nets about a mile wide—around—they are heavy things. There are nine oarsmen and the pilot and the captain and the man who works the net, and the cook and engineer are left on the vessel or the schooner to trim the sails and the cook to get a hot supper ready and warm beds. And the engineer is supposed to follow about a mile behind because the fishing is a hard job and they get awful nervous. When they are about to catch the fish they go out and find where they think there ought to be a school of mackerel, and when they see a school, they catch as many as they can in the net.

Any one want to ask James any question?

It isn't a question, but is it in New Bedford after they get the whales, that they blow them out and look like balloons?

Well, do we have whale fishing on the New England coast? What is most of our fishing there?

Cod and mackerel.

Do they go whaling, James, often?

They start out from the New England coast. New Bedford is a great whaling port.

I thought some of you would want to ask James about one or two things.

I would like to know how many small boats belong to a schooner.

Well, I should say they don't use small boats any more, that is, dories; and in schooners they use larger boats than dories.

Where did you get all that information?

I got it out of here (holding up a book). I could have gotten a lot more. There is so much of it.

Any one want to ask a question?

It isn't a question, it's a statement. But for three miles out from the coast of New England all of that coast really belongs to the United States and any one can fish along there and beyond that other nations can fish.

No, it belongs to the person who owns the land.

Well, that is what it said in Allen.

What is it?

I haven't a question either, but I have that same point that James did only I didn't have as much. I found that they do use the little boats far out for fishing—they use schooners—but they use quite a lot near the land for other kinds of fisheries. I can't quite remember what kinds they use, but they are a sort of tug boats. I even saw them in the English Channel when I went over.

I had a point about fishing. There is more cod fishing than any other kind, and mackerel, herring and blue fish are also caught along the coast of New England. In Gloucester, they manufacture things that the sailors need, such as lines, nets, and other things. Formerly, they used to get a great many fish that weren't small fish up around Southern Canada, and each man used to use a dory, but now they don't fish so much there but they do more

deep sea fishing; and a deep sea fisherman is provided with provisions, nets, lines, baits, and other necessities. And many sailors go off to the banks of Newfoundland where the banks are shallow, and shallow water is the home of many small fish; and for this reason the big fisherman goes there.

That is very good. Have we something else important?

I have some pictures to show.

Will you leave those for the present? We are really considering New England as a manufacturing center. Have we a right to take the fish then as one of our topics?

Yes.

Because they manufacture a lot of things from fish, and they manufacture different things that come from the fish. There are tons of refuse for fertllizer that they use, there is a lot of fertilizer necessary . . .

And I have smelled some other kind of factory up there.

Glue.

And that fish glue doesn't smell very nice while it is being prepared. Then I suppose we could speak of the canning of fish almost as a manufactured product. R told us in the first place that we wondered especially about New England being a manufacturing center because they had so few of the raw products for manufacturing. Would you say that held true in the case of fish?

But it doesn't have any coal so that to a certain extent it will hold true in all manufacturing.

But with the fish to a less extent than with the other things. Who else is ready to report?

I have a different one—wool (Has samples of wool in different stages on small paper charts). This is . . .

Wait a minute. I think we should keep in mind that we are trying to find out about the manufacturing of New England.

This is one of the manufactures of New England. This wool, comes from the western states—right off the sheep's back. Then it is washed and scoured, and here it is washed and scoured and ready for combing. Here it is combed, and when you see a lot of it that has been combed it looks like cotton. It is in strands like hairs. And this is ready for spinning. Here it is spun into the regular yarn, and it is ready for dyeing. Here are some dyed pieces of wool and they are ready for weaving. Here's a piece that shows how it looks as it is woven—the way the strands go this way and that way; and here is a piece of woolen cloth.

Piece of what?

Woolen cloth, ready to cut and be made into clothes.

In the first grade we made some of those, and we learned there are two kinds. The warp and woof they call them.

How do you come to know so much about wool and where did you get your samples?

My father is in the business.

Where is his factory?

Daddy hasn't a factory. He just got these for me.

Oh, he isn't in the wool business. What do you mean?

He sells pieces of goods but he doesn't manufacture the cloth. He just has big pieces.

Where does he get his big pieces from then?

Well, Daddy gave me these and some men he knows gave him the others.

But what I would like know is where Daddy gets his woolen cloth from.

I will ask him.

All right. I wish you would—the factory from which he buys most of his goods, whether or not it is in New England.

Is there any one else who has anything to tell us about wool manufacturing of New England? I would criticize E's report—and not altogether favorably, I think. What has she failed to do?

She has failed to tell us anything about the wool manufacturing.

Yes, Jane, what are you to report on?

Wool.

All right, let's hear you.

The wool in the United States isn't as fine as some wool. Some wool is finer—this wool is coarser than most. I don't know why it is, unless it is different kinds of sheep, and different kinds of sheep have different kinds of wool. And over in Italy they have lots of it and it's very fine wool and we import some here to manufacture it. Some sheep are very good mutton and some are very good wool. It depends, I guess, on what kind of food they are given. Here I have a picture of the sheep as they are on the ranch; the next shows the sheep as they are sheared for their wool; then the wool is shipped to New England and other places on the eastern coast where it is made into cloth. In this way when the wool arrives at the factory, the wool is sorted according to value, because some wool is so much coarser and some wool is much finer, and the value depends on how coarse the wool is, or if it can be made into cloth easily. It also depends on how good the wool is. It is put into different piles, then the dirt is removed. So much dirt is in the wool that it has lost almost half of its weight. After being dried on racks and carded by a machine, which leaves all of the fibers even, and with a number of other processes, it is soon ready for spinning. One of those processes is dyeing.

Do you know what would make that report far more interesting?

If she didn't read it.

Yes, who has a report on wool, ready to tell us about it in an interesting way?

Wyoming is the greatest sheep producing state. If they were passed in front of you, one by one, you could stand and count them, and you wouldn't finish for four months, so you can see how many sheep there are in Wyoming. More than fifty million sheep are raised in the States, and more than half of the woolen cloth made in the United States is woven in New England. Therefore great

quantities are sent there. Boston and London are the greatest wool markets of the world. Between three and five hundred millions of dollars' worth of wool are manufactured in New England and yet Great Britain manufactures a still greater quantity.

There has been quite a lot of conflict between sheep and cattle owners. The sheep eat grass very close to the ground so that cattle can't graze there. Also the sheep have a peculiar smell which the cattle don't like. And therefore there has been a lot of conflict there.

Was that report a good one?

Yes.

What was good about it?

I was going to say something else about it. It was so much on the western states and not so much on New England.

Well, she has told us considerable about the sheep in the western states, but she did tell us the important facts about New England. Who remembers?

The biggest wool manufacturing centers.

No, she did not say the greatest wool manufacturing centers were London and Boston.

The greatest distributors.

The greatest wool markets. They take the raw wool and distribute that, and then they take manufactured goods and distribute them, but they may not be the greatest manufacturing centers. We will carry that out a little later.

Is there anything else on the subject of wool? Let's think again of what J told us. What did she tell you that gives you an idea of the extent of wool manufacturing in New England?

That it is the greatest—next to Great Britain.

Next to Great Britain, it is the greatest wool manufacturing district of the world.

Right there they make about half of all the wool made in the United States.

And Brockton makes about half of what is made in New England.

I have something about sheep in the beginning.

Does it bear directly on the New England situation?

It goes on to say that they weren't any sheep because during the glacier they were killed.

I would say that they were killed by the glacier. That is hardly true. But they had to be brought from Asia.

J said most of the wool comes from our own western states, Wyoming and Montana. Any of you find out about wool that comes from any other section of the world? Who has? We get a great deal from two other sources.

Australia and Argentina.

That is right. A great deal comes from those two places.

This class was attempting to use the problem method. The lesson given was the second on the New England States. In the first, the teacher had asked for suggestions for problems, which elicited about a dozen from the class. The children had voted to accept the one quoted in the first paragraph in the lesson above, namely, "Why do they manufacture so much material when they haven't the (raw) material to manufacture?"

In lines 7 to 15, the teacher stated that before they could answer the main question they had to "get an idea of how great a manufacturing center it (New England) is" and to look up "the different kinds of manufacturing that are done in New England," and "get some idea of the amount and different kinds." This, then, is the assignment which preceded the lesson quoted.

No careful study of the basal text had previously taken place. The class had been practically turned loose to browse anywhere they pleased. They naturally soon lost sight of the assignment in the collection of facts about the industries. For instance, in the discussion of fishing in lines 22 to 74, there are no statements of a quantitative nature to indicate that the pupil had been trying to "get an idea of the amount" of fishing done; nor are there evidences of the problem attitude or of thinking on the question stated in the assignment. The boy had simply read some material which interested him and was telling about it. There was apparently no weighing of values of the facts presented, either in the light of the assignment or according to any other criterion.

In the discussion which follows, lines 75 to 98, no questions are asked by pupils or teacher which bring out the relation of the boy's recitation to the main problem.

In the recitation on wool, lines 144 to 170, more material is presented which is quite irrelevant to the main problem; indeed, the pupil did not even ask her father, from whom she received her information, whether the factory with which he was connected was located in New England. This is clear evidence that she had completely lost sight both of the main problem and of the assignment.

The other two recitations on wool, lines 180 to 199 and 204 to 218, deal more with the western states than with New England, showing again that the children were largely oblivious of the real points at issue. Moreover, it is indicated that the first child read

her report; one wonders how much of it she or the class will retain.

The sort of recitations given by the children are worthy of note from another point of view. Long ago we discarded in the elementary school the method of instruction characterized by lecturing by the teacher; yet most of this lesson consists of lecturing by the pupils. There is no evidence that this is any more effective than lecturing by the teacher.

The writer does not mean to imply in all of this criticism that children should never be allowed to browse and then tell the class about what they have read. But is does seem unreasonable to expect children to gain the essential facts about New England through a series of such lessons as the one given.

The entire lesson is of a diffuse, unanalytical character; the questions asked by the pupils are few in number and are either trivial or off the point. To be sure, some of the most important facts about the New England States are mentioned in the discussion, but they are so embedded in unessential details that they have little chance of being permanently retained.

Although there are no data to prove it, it stands to reason that if the pupils had had the common body of important and essential information which would have resulted from an early study of the text, they would have had a better basis for evaluating and criticizing the reports that were given than they show evidence of having in the lesson under discussion; and those who reported would have had a better foundation for weighing the worth of the material on which they were preparing to report.

Reference has already been made to the importance of making the recitation period a thinking rather than a testing exercise. But in practice, teachers sometimes forget that thinking cannot take place in a mental vacuum; that "successful reasoning depends upon an abundance of ideas, particular and general facts and principles. In reasoning, we pick and choose among facts; view this and that together. An eminent thinker once compared the situation during reasoning to two chambers, a main chamber in which manipulation and study were going on or in which the leading ideas were being rehearsed, and an ante-chamber crowded with ideas seeking an entrance to the main room. Unless the ante-chamber were well filled, little could be done. The most hopeful sign of probable success was an ante-room teeming with

candidates for a 'trial'. If we are to become competent thinkers in any line, the first and, by all odds, the most important thing is to accumulate experience and master the facts in the field. Without the facts and experience, the most gifted mind would be helpless. . . . Originality is not opposed to the amassing of facts or the laws of ordinary learning, but dependent upon them." [6]

The above statements do not, of course, mean that a student should spend most of his time in the collecting of facts with the vague hope that he may sometime have use for them in reasoning processes. But they do mean that if a teacher expects his pupils to select through intelligent class discussion a study problem about New England, for instance, and to reason about this question during the recitation, then preparation for such a thinking period must involve the acquisition of facts and ideas about New England.

The assignment of acceptable objectively scorable study questions might be expected to engender such knowledge better than merely instructing children to "study the book." Moreover, the teacher, knowing definitely the quantity and quality of the study which has taken place before the class meeting, would probably feel less pressure to assure himself that the children know the main facts, and consequently would be freer to lead the thinking of the class.

[6] Gates, A. I. *Psychology for Students of Education*, pp. 136-37. Macmillan, 1923.

CHAPTER III

CHARACTERISTICS OF THE QUESTIONS USED IN THIS SERIES OF EXPERIMENTS

Reference has already been made to the fact that the study questions used in this investigation constitute a type of lesson assignment. In this connection the writer would again emphasize that they are not to be considered as the only type of assignment, applicable to all lessons or to all situations. A good teacher varies the sort of study which he requires of his pupils, depending upon the kind of mental growth which he expects. Whatever conclusions are reached, therefore, in this experiment should be considered as applicable to one sort of assignment under certain specified conditions.

Like the usual questions which are employed in silent reading tests, the study questions closely parallel the text. In order to illustrate this point a portion of Smith's *Human Geography* is given below, and after it are placed the study questions which were used in connection with it.

THE GREEN NORTHLANDS

Scattered lands of green grass, flocks and fish.—What islands lie between Scotland, Norway and Iceland? (Fig. 319.) These islands together with Iceland, west Norway and the southern part of Scotland are covered, where there is any soil, with green grass, bushes, or trees. The summers are so cool and wet that it is almost impossible to plow the ground and grow grain. But all this moisture is good for grass, and there is scarcely another place in the whole world where grass is so very green. Flocks of sheep and herds of shaggy cattle and short-legged, thick-coated ponies are a source of wealth. Animals in this region can run at pasture for more months in the year than is possible in New York State. When snow covers the ground, they are fed on hay that is made with great labor (Fig. 330).

The inhabitants of the Northlands are brave and hardy sailors whose chief industry is fishing. They catch quantities of cod and herring which they dry or salt for export.

Most of the people live in stone houses roofed with thatch or sod and heated with peat fires (Fig. 333).

407. *Sailing in northern seas.*—Every summer, steamers carrying tourists sail from New York to Iceland. After sailing around that island, the boats

go on to the northernmost tip of Europe. What cape forms the tip? (Fig. 325.) In the same latitude the seas of North America are so full of floating ice that in three centuries of trying, only one explorer has sailed his boat across from the Bering Strait to Davis Strait, and the voyage took three years of hard work (Sec. 359).

What makes such a difference? The answer is *ocean*, and *currents*. The Gulf Stream is a great current of warm water that flows from the tropical part of the Atlantic Ocean (Fig. 327). The trade winds of the Atlantic blow a current of warm water into the Caribbean Sea. This current forces its way into the Gulf of Mexico and, like a great river within the ocean, flows out between Florida and Cuba as fast as a man can walk, and carries eighteen hundred times as much water as the Mississippi River. This ocean river or stream can be traced as far northward as Newfoundland. The prevailing westerly winds carry some of this warm water on past England, past Norway, and into the Arctic Ocean. When it reaches northwest Europe, it is still warm enough to cause the winter temperature to be much less severe. Labrador, in the same latitude, is very, very cold. Why? (Fig. 327, Sec. 251.)

Examine the winter temperature map (Fig. 329), and then pick out a city in Iceland, three cities in North America, and three in Europe that are near the January isotherm (equal temperature line) of 32°.

How many degrees of latitude and how many miles lie between the northernmost place and southernmost place having a January temperature of 30°?

408. *A warm north coast.*—In winter the bays along the Labrador coast and the harbor of Vladivostok are frozen shut, but the harbors along the entire Norwegian coast are open because the warm water of the eastern Atlantic Ocean keeps them from freezing. During the World War it was found that when Archangel was closed by ice, the little Russian port of Murmansk on Kola Bay in Lapland was open (Fig. 325). A little of the warm Gulf Stream water slips around the North Cape and keeps the ice away.

409. *A cool, damp summer, and a raw, mild winter.*—Look at Figures 328 and 329. You will see that the summer is warmer and the winter is colder in the great forests of the Mackenzie Valley and central Siberia than it is in Iceland, west Norway or the north of Scotland. The long hours of sunshine heat the land surface quickly, but the sea is heated very slowly. There are several reasons for this, one of which is that the stirring of the water by the wind causes the sea to be warmed to a greater depth than the land. Another reason is that more heat is required to raise the temperature of a given amount of water than is needed for the same amount of earth. Water holds its heat longer, and therefore oceans and other large bodies of water are warmer in winter and cooler in summer than is the land. The west wind, warmed by the ocean in winter, gives the green Northland region a winter that is cool but not cold. In summer, this same ocean cools the wind and gives the green Northland a summer that is almost as cold as the winter (Figs. 328, 329), besides having much dampness and rain. Those countries which have a cool summer and a warm winter because they are near the ocean from which the prevailing winds blow are said to have an oceanic climate. What is the difference between the average temperatures in July and January in west Norway? In east coast Siberia? In central Siberia?

The writer's study questions on this portion of the text follow:

STUDY QUESTIONS

Sections 406 to 413, pages 210 to 214, tell about the Green Northlands of Europe. Paragraph 406 tells what the principal industries of this region are. Write them here.

.....and.....

Why are these the industries of the Green Northlands? Read from section 406 through section 413 with that question in mind. Read these sections twice. Then see how many of the questions below you can answer. After you have answered all you can, find the answers to the others in the book.

1. Write below the names of the islands which lie between Scotland, Norway and Iceland.

....., ... and .....

2. Underline the best reason why the land in this section is used chiefly for pasturage.
   a. There are many cattle and sheep there.
   b. The islands are covered with snow in winter.
   c. The islands are too wet to plough in summer time.

3. Fill in the blank spaces.
   Partly because of the fact that this region is not suited for agriculture, the chief industry of the people is.....(look at the picture on page 210). ..... and ..... are salted and dried for export. The people's houses are made of ..... and have ..... roofs.

4. Underline the best title for section 407.
   a. Summer tourists in northern waters.
   b. Why northern waters near Europe are warmer than those near North America.
   c. The Gulf Stream.
   d. Ocean currents of the Atlantic Ocean.

5. Cross out the wrong words.
   Ocean currents make the lands we are studying {warmer / colder} than they would otherwise be. The Gulf Stream flows from the Caribbean Sea and the Gulf of Mexico {northeast / northwest} across the {Atlantic / Pacific} Ocean. The current has {twice / ten times / 1800 times} as much water as the Mississippi River.

6. Put a T before the sentence below if it is true and an F if it is false.
   ..... The ports on the eastern coast of Siberia are open longer than those on the western coast of Norway.

7. Fill in the blank spaces below with the words "water" or "earth." Be sure to put the right word in the right place.

..... heats more slowly than.....
..... cools more slowly than.....
..... is warmed to a greater depth than.....
..... holds its heat a shorter time than.....

One of the most obvious characteristics which will be noted in the above questions is that they are objectively scorable. The correctness or incorrectness of an answer can be as definitely determined as in the case of an answer to a problem in arithmetic. This means that the judgment of the teacher plays a minor and unimportant rôle in the correction of the papers. As was done in this experiment, a certain score value may be assigned by the instructor to each question, such score being determined by the teacher's conception of its value; but once this value is determined, the pupils can grade their own papers as satisfactorily as any one else can. Such correction by the children, moreover, has the value of calling the attention of individuals in the class to their mistakes and misconceptions, thereby strengthening right bonds and weakening wrong ones.

It cannot be too strongly emphasized that the above questions do not constitute an examination; on the contrary, they are intended only as guides to study. In order that this fact may be made perfectly clear, the examination questions on the passage quoted are given here.

Put a T before each true statement and an F before each false one.

... The summers in the Green Northlands are cool and very wet.
... The climate in the Northlands is favorable to the growth of grass crops.
... Grazing is one of the chief occupations of the Northlands.
... The average temperature of any region is determined entirely by its distance from the equator.
... The waters of the Gulf Stream temper the climate of North America.
... Iceland, which lies near the Arctic Circle, has a climate more severe in winter than Canada or northern New England.
... The Gulf Stream is like a river of warm water flowing through the Atlantic Ocean.
.. It requires less heat to raise the temperature of water than to raise the temperature of an equal amount of earth.
... Few fish are found in the cold waters of the north.
... The direction of the prevailing winds helps to force the Gulf Stream toward the western coast of Europe.

A further statement with reference to these tests should be made. If the same person had made both the study questions and the test statements, he would have had a natural tendency to make their subject matter completely coincide. In this case, he might with propriety have been accused of using the study questions as a method of coaching the class for the tests. Therefore the experimenter himself wrote all of the study questions, but secured graduate students at Teachers College to make the tests. He did not see these tests until he had finished the study questions, nor did the graduate students see the study questions until they had made the tests. Thus the pupils who used the control method of study were given as fair a chance in the tests as were those who used the study question method.

The question naturally arises as to the relationship between the sort of study questions used in this investigation and the type of exercises which are usually found at the end of chapters in geography texts. For purposes of comparison, the questions in the *Human Geography* on the subject matter previously quoted are given below.

1. Why are these scattered lands studied as one group?
2. Compare the climate of this region with the climate of the west shores of the Atlantic in the same latitude. Why is the pasture season longer here than in the state of New York? What coast in North America has climate similar to west Norway?
3. What other coast that you have studied is somewhat like the coast of Norway in formation? (Fig. 165.)
4. Why do the people of Norway have more ships than the same number of people in the United States?
5. Why are the people of the Northlands fishermen? Of what people in North America do they remind you? Why are they hardy seamen?
6. If you should go to Iceland to live, in what business would you like to engage?
7. Read stories of Odin, Thor and others that the old Norsemen have given to us.

The most apparent difference between these and the study questions used in this experiment is that the latter are objectively scorable. But this is not the most fundamental difference. The two types serve entirely different ends. As already stated, the purpose of the objectively scorable questions is to secure and to

make more efficient a careful reading of the text. If they help to secure retention of the ideas and facts in the text, they will have served their chief purpose. They are to be assigned at that time in the teaching process when it is necessary that the pupil acquire a control over the facts given in the book. They are not intended to guide classroom discussion nor to direct or suggest collateral reading.

A glance at questions 2, 4, 6 and 7 above brings out the contrast we are trying to make clear. Questions 4 and 6 would form excellent bases for class discussion. They would stimulate lively periods of pupil activity in the recitation and would be likely to evoke expressions of varying ideas and points of view. It should also be noted that answers to these questions require the sort of control over the subject matter of the text which might well have been acquired through the kind of reading and study which would result from the use of the objectively scorable study questions.

Questions 2 and 7, on the other hand, demand collateral reading, and attempt to direct it into profitable channels. They are not intended to guide the first study of the preceding chapter; rather, they are calculated to fix its facts and ideas through their use in thought problems which involve comparison and contrast.

The objectively scorable questions, then, are not intended to supplant or replace the questions that are now in the texts, in so far as the latter either suggest broad problems for class discussion or help to direct collateral reading. In so far as the existing questions in the geography books refer particularly and solely to the facts as given in an individual chapter, the results of this investigation tend to show that they may well be replaced by objectively scorable questions.

The subject matter in *Human Geography* which was used in this experiment included pages 203 to 250. One-hundred fifty-eight study questions were made on this portion of the book. The procedure which the experimenter adopted in making the questions was as follows: He read a given section in the geography, keeping these problems in mind, "How can I make questions on this portion of the text which (*a*) are capable of objectively scorable answers and which (*b*) involve some important mental reaction to the facts given in the book?" It is natural, therefore, that there should be in the complete list, various kinds of exercises; and since there was at this stage of the work no desire to be hampered

by considerations of classifying them into types, the problem of such classification later was rather difficult. In general, however, they may be divided into eight different classes. A description of these classes, with samples and the total number of exercises of each type is given below.

I. Questions which involved the selection from a number of alternatives of the best reason for a situation or the best title for a paragraph.

Samples:

Underline the best reason why there are many nations in Europe.

1. Europe has three times as many people as North America.
2. European nations have developed a strong national spirit.
3. Many parts of Europe are protected from invasion by valleys, bays and peninsulas.

Underline the chief point of difference between the European Forest Belt and the American Forest Belt.

1. The people do not kill the same animals.
2. The people do not eat the same kinds of food.
3. In Europe some of the land has been prepared for farming.

Total number of such exercises, 50.

II. Questions involving the matching of items which belong together.

Samples:

Below on the left are three problems which the Low Countries have to face. Below these are three ways that the Low Countries use to solve these problems. Select the right solution for each problem and write it in the blank space.

Problems:

1. Rivers fill up with sediment .....
2. More dock room needed .....
3. Hard to build roads in damp countries .....

Solutions:

Use canals for roads.
Dredge rivers and make dikes.
Build greater docks.

On the left of the page are some facts about England. Below this are the results of these facts. Select the correct result for each fact and write it in the blank space after the fact.

1. Sea boundary between England and Europe .....
2. Many drowned valleys like Hudson River .....
3. British factories produce excellent goods .....

Results:

Great Britain a great importing and exporting center.
Great Britain has been able to keep out of many wars.
Excellent harbors for shipping and trade.

Total number of such exercises, 5.

III. Statements to be marked true or false

Samples:

Write a T or an F in front of these sentences.

... England has a small carrying trade.
... The quickest way to go from New York to Russia is through England.
... The English are not an energetic people.
... Norwegian ships carry only Norwegian products.
... Water power will probably be an important factor in the future industrial development of Norway.

Total number of such exercises, 6.

Questions like those described under these first three classifications were intended to help the children to think, reason or summarize on the basis of the facts given in the text. By indicating new and different bearings of the facts of the book, it was expected that such questions would strengthen mental connections through enlarging the area of stimulated nerve centers. In terms of the literature of study, this sort of problem assists in an elementary way in the organization of ideas.

IV. Exercises involving the completion of sentences.

Samples:

Fill in the blank spaces.

The landscape in Holland and Belgium is like a procession of .... Iron ore for factories comes from the province of ..... in the country of ..... The greatest iron manufacturing region is near ..... The ..... river carries the ore to the famous ..... Works, which formerly manufactured guns. Now this plant manufactures .....

Complete the following sentences:

The climate of Ireland is too ..... for wheat. The chief agricultural products are ..... and ..... Houses are built of ..... The people burn ..... in their fires.

Total number of such exercises, 10.

V. Exercises demanding the selection from two or more alternatives of the correct word or phrase.

Samples:

Cross out the wrong words.

In 1492 the richest men in England lived in {northeastern / southwestern} England.

Their chief industry was {manufacturing. / farming.}

Cross out the wrong words.

The Clyde River is {the greatest / one of the greatest} shipbuilding center(s) in the world. Belfast is a center for {mining. / shipbuilding.} British coal is used for smelting {many / only iron} ore(s).

Total number of such exercises, 22.

VI. Exercises requiring the selection of the products of a given country, of the industries of a locality, or of similar facts.

Samples:

Underline the products for which the English climate is suited.

Corn	Rye	Potatoes
Wheat	Small Grains	Tobacco
Cotton	Sugar	Garden vegetables

Underline the three things which offer the greatest promise for the future of England.

Agriculture
Grazing
Cattle Breeding
Coal Deposits
Oil Production
The Climate of the Country

Total number of such exercises, 14.

VII. Exercises requiring the children to write the names of cities, industries, bodies of water, products or the like.

Samples:

Write below in the first space the name of the most important metal produced in the great forest section of Europe. Write in the next spaces the two countries which chiefly import it. In the next spaces write the names of the two bodies of water over which it is carried in boats. The words "Winter" and "Summer" will tell you in which space to write each body of water

You will need to look at the map on page 204 and find Narvik in Norway to answer the last part of this question.

.... Winter .....
.... Summer .....

Write in the first spaces below the names of three textiles other than cotton which are manufactured in the British Isles. Write in the next space one city which manufactures that textile. Write in the third space one use to which you have seen this textile put.

1 ....
2 ....
3 ....

Total number of such exercises, 41.

The writer looks upon such exercises as are included under IV through VII as being analogous to note-taking in adult study. If two cities are important to remember in connection with a certain country, writing their names tends to impress them on the mind. It may readily be conceded that such questions, unaided by recitation periods or reviews, may be of little value in securing permanent retention of facts. But it is even more certain that the mere hasty reading of such items will secure retention even less surely. It must stand to reason that such questions, through forcing children to read carefully and understandingly and then to make some immediate use of the subject matter read, are more likely to produce retention than reading without any immediate use. And, indeed, such proved to be the case in the experiments which were conducted.

VIII. Exercises involving the use of arithmetical calculations.

Samples:

It takes about twenty-four hours to go from New York to Chicago. About what part of this time does it take to go from London to Paris? ..... Would the service by airplane take a longer or shorter time? ..... About how much longer or shorter? .....

Notice what the text says about the amount of cotton cloth produced in England during 1919. See if you can figure out the total number of miles this amount represents. Put the number here. .....
About how many times to Chicago and back would this reach? .....

Total number of such exercises, 6.

The questions described and illustrated under VIII were intended to help the children to "supplement the thought" [1] of

[1] McMurry, F. M. *How to study*, Chap. IV. Houghton, Mifflin, 1909.

the lesson. Statements dealing with quantitative relationships lend themselves naturally to comparison and contrast; a principle well understood and frequently applied by skillful public speakers. Such calculations as are required by the exercises above seem to assist in visualizing facts through associating them with mathematical relationships already known by the pupils.

In conclusion, it may be said that all of the various kinds of exercises used in this experiment exist primarily for one purpose—to secure from the children a constant mental reaction to the printed page. The writer remembers vividly the dull, passive, spiritless manner with which he used to read and reread his geography lessons, hoping enough of the facts would "stick" to get him safely through the stormy period of the recitation. In the better schools, methods of study have been much improved since that time; greater care in the assigning of lessons and more purpose on the part of the children have done their work in making study a livelier process. Results from the experiments with objectively scorable study questions seem to show that they will be of assistance in this trend toward improvement.

It is probable that some of the kinds of exercises described in this chapter are more valuable than others. The problem of their evaluation, although beyond the scope of this study, might well be subjected to scientific experimentation. A variety of tests was used in this investigation for two reasons. In the first place, it was assumed that such variety would appeal to children. In the second place, as already stated, the experimenter tried at all times to use the type of exercise which seemed to him to fit best the sort of subject matter involved.

CHAPTER IV

EXPERIMENTS IN SPEYER SCHOOL

The experimenter was able to secure the use of three forty-minute study periods a week with two seventh-grade classes at the Speyer School, New York City. Homogeneous grouping on the basis of group intelligence tests is in force at Speyer, and the classes used in the experiment were numbers three and four, two of the lower groups.

Geography is not studied as a separate subject at this school, but is taken up only in connection with history and civics in the social science course. In this course no recitation periods were concerned with the subject matter used in the experimental work, so class hours did not constitute a variable in the work. Since the object of the experiment was to test the efficacy of two methods of study, the writer made no attempt either to question the class on the assignments or to conduct any form of class discussion on them. Of course these conditions are artificial; but they were necessary to insure completely controlled study conditions.

Of the three periods a week which were allotted for the work, the first two were used for study of the text; the last was divided into twenty minutes for review and twenty minutes for a true-false test of forty statements, covering the subject matter of the first two periods. The experiment was continued for six weeks.

The rotation experimental method was used throughout. This method was used by Pearson and Suzzallo [1] in 1912 in experiments to determine teaching technique in spelling; and was also employed by Hosic in a study of children's reading.[2] A full exposition of the procedure of rotation experiments, and the computation formulæ for the interpretation of results are given by McCall.[3]

In the present investigation, methods of study and groups of pupils were rotated each week. Thus if Class A constituted the

[1] Pearson, Henry C. and Suzzallo, Henry. "Comparative Experimental Teaching in Spelling," *Teachers College Record*, Vol. 13, No. 1.
[2] Hosic, James F. *Empirical Studies in School Reading.* Teachers College Bureau of Publications, N. Y., 1921.
[3] McCall, W. A. *How to Experiment in Education*, Chap. VIII, Macmillan, 1923.

experimental group the first week and Class B the control, Class B was the experimental group the second week and Class A the control. In this way each class was the experimental group three weeks of the six and the control group for the other three. Thus the six-week period divides itself naturally into three two-week units, in each of which each class was used both as an experimental group and as a control group. Results were calculated for each two-week unit, and a summary was made for the entire period.

The only particular in which the writer did not follow McCall's description of the rotation experimental method consists in the omission of the initial tests. The individual children were assumed to have at the beginning about as much knowledge of the work of one week as of the work of any other week. This assumption was considered to be justified because the experiment extended over several weeks, because a large amount of subject matter was involved and because the true-false statements were very specific, requiring exact knowledge of the text rather than general knowledge of geography.

Of the omission of the initial tests, McCall says,[4] "Sometimes it is an advantage to keep pupils ignorant of that upon which they are to be tested until the experimental factor has been applied." This was precisely the situation in the present investigation. It was desirable to have the study situation of the control group approximate as nearly as possible the actual situation in school practice. If initial tests had been given, the pupils would have had some idea of what to study, and the normal conditions would have been to that extent destroyed.

The text used in this experiment was *Human Geography*, by J. Russell Smith. The books were distributed at the beginning and collected at the end of each study period in order that there might be no intervening reading of the text to disturb the controlled conditions. To the experimental group, study sheets containing page assignments as well as study questions were distributed with the books, and the pupils were told to follow the written directions. Copies of all the study sheets are included in the Appendix. With the control group, the books were distributed and the pupils were told to study as well as they knew how the same sections in the book as were covered by the study sheets furnished to the other class.

[4] McCall, W. A. *How to Experiment in Education*, Chap. VIII.

At the review and test period, the books and study sheets were again distributed. The control group was told to review the week's work in preparation for the test. The experimental group was told to review the text and the study sheets. At the end of twenty minutes, the books and study sheets were collected and the test was given.

In scoring the papers, the procedure of subtracting the number wrong from the number right was followed. McCall's formula[5] for the rotation experimental method was used for interpreting the data in the case of each of the three two-week units. Table I, Appendix III, shows the results of the experiment according to this formula.

In each of the two-week units, the average scores of the study question groups were higher than those of the control groups. In order to interpret the significance of this difference, the formula which was employed uses the experimental coefficient, or E.C. A positive E.C. indicates a probable superiority of the experimental over the control method. An E.C. of + 1 or greater indicates "practical certainty"[6] that there is a true difference in the values of the two procedures. An E.C. of .5 indicates only half certainty, and so on for other values of the E.C. The E.C. may also be expressed in terms of a statement of chances that there is a real difference between the two groups; for instance an E.C. of .7 means that the chances are 38 to 1 that there is a true superiority of the experimental method.[7]

The experimental coefficients for the three two-week units are: .739, .17 and 1.57. Each of these is positive, but they vary considerably in significance. Thus, the coefficient for the second two weeks, expressed in terms of a statement of chances, is only about 2.5 to 1, while that for the final period is greater than 65,000 to 1. The experimenter, therefore, felt the need of combining the results for the total period of work. For this summary, he used Yule's formula[8] for combining distributions, to determine the means and standard deviations, and then used McCall's formula, previously referred to, to arrive at the final experimental coefficient.

[5] McCall, W. A. *How to Experiment in Education*, p. 187.
[6] *Ibid.*, p. 154.
[7] *Ibid.*, p. 155.
[8] Yule, G. U. *An Introduction to the Theory of Statistics*, p. 142. Charles Griffin & Co., London, 1912, Ed. 1919.

The summary is given in Table II, Appendix III; an E.C. of 1.34 was the result. Since an E.C. of 1 is equal to "practical certainty,"[9] 1.34 is clearly significant of a true superiority of the objectively scorable study question method.

The writer was anxious to determine whether the differences between the two groups, which resulted from the study question method, would persist or whether they were largely transitory. In order to determine this, he waited two weeks after the end of the six-week experimental period, and then began to give again the same six tests as had been given the first time, allowing one week between each two tests. Thus there was a period of eight weeks between the time when a test was first given and the time when it was repeated.

Table III, Appendix III, shows the results of the second tests. The experimental coefficients are .29, —.06 and .77. The second of these is negative, but is so small as to be entirely insignificant. Reference to the results of the original tests, moreover, shows that the first E.C. for this two weeks period was very small, being but .17. The summary of the second testing, given in Table IV, Appendix III, shows that the difference between the groups did persist, a final E.C. of .538 being found.

The second E.C.'s are all smaller than the first. This fact is explainable when one recalls the typical curves of forgetting.[10] The amounts of knowledge of both groups, starting with a considerable difference between them, are gradually approaching the same level. Therefore, as the two curves approach each other, the experimental coefficients tend to become smaller.

[9] McCall, W. A. *How to Experiment in Education*, p. 154.
[10] Thorndike, E. L. *Educational Psychology*, Vol. II, pp. 304-306. Teachers College Bureau of Publications, N. Y., 1913-14.

CHAPTER V

EXPERIMENT AT PUBLIC SCHOOL 43

In most respects the experimental work at Public School 43 duplicated that at the Speyer School. The same study material was used and the same general procedure was followed. There were, however, some important differences.

In Public School 43 regular instruction in geography is part of the curriculum. The writer therefore was faced with two alternatives; first, he might select some portions of the world which were not being regularly studied in the upper grades and make them the subject matter of his experimental work, or second, he could use for it the same countries as were required by the course of study. The latter plan was decided upon, because it was not considered wise to divide the efforts of the class in geography.

The principal offered for experimental purposes a sixth-grade class of thirty-six boys. This group had no regular text in geography, the teacher using oral presentation and reference books. In the main he covered during the six-week duration of the experiment much of the material required by the study sheets; but he approached it from an entirely different point of view.

For the periods of study required by the experimental procedure, the class was divided into two groups. The division was an arbitrary one, based on the seating plan of the room, not on intelligence or achievement, for the rotation method does not require exact matching of groups or pairs.

The conduct of the study periods and tests was the same as at Speyer School. Table V, Appendix III, gives the results for the six weeks of work. The experimental coefficients are .59, .65 and .19. Again, all of the E.C.'s are positive but they are somewhat lower than those at Speyer School. This might be accounted for by the fact that the regular work in geography duplicated to a considerable degree the work required by the experiment.

Table IV, Appendix III, gives the summary of the work at Public School 43, calculated according to the formula previously described. The final E.C., .84, is not so large as at Speyer School, but it is clearly significant. Expressed in a statement of chances the ratio is about 100 to 1.

CHAPTER VI

SUPPLEMENTARY EXPERIMENTS AT ROSELLE, PASSAIC AND STAMFORD

Although the results of the experimental work at both Speyer School and Public School 43 are significant, the writer felt the need of trying similar experiments in other schools. In the first place, this would increase the number of pupil participants, and in the second place it would test the study question method in other localities than New York City. He therefore secured for experimental purposes two sixth-grade classes at Passaic, New Jersey, and four seventh-grade classes, two each at Roselle, New Jersey, and Stamford, Connecticut.

At each of these three places, one two-week unit of the material prepared for Speyer School and Public School 43 was used. The teachers regularly in charge of the classrooms conducted the work, following the same procedure as used in the New York City schools.

One hundred and sixty children participated in the experiments at Roselle, Passaic, and Stamford. With the numbers at Speyer School and Public School 43 added, this brings the total number of children who were used in this investigation to about two hundred and fifty.

Table VII, Appendix III, shows the results of the three two-week units at the cities mentioned above. The E.C. at Roselle was .978; at Passaic, .013; and at Stamford, 1.29. The E.C.'s at both Stamford and Roselle are significant; that at Passaic is positive but so small as to indicate but a negligible difference between the two groups. However, the summary, given in Table VIII, Appendix III, is .99, which is equivalent, as previously stated, to "practical certainty." The results of these three supplementary experiments, therefore, confirm those obtained at Speyer School and Public School 43.

CHAPTER VII

REPORT OF WORK AT HACKENSACK

In laying his plans for the experimental work of this investigation, the writer recognized the desirability of two types of studies. It was obvious that carefully controlled experiments were necessary in order to determine objectively the worth of the questions. The preceding chapters have indicated the methods and results of these controlled investigations.

It also seemed necessary, however, to determine the reception likely to be accorded by teachers to the study questions. As has been previously stated, it is important to show not only that a new technique will do what it is expected to do, but also that it will fit into present teaching practice. This latter question is largely in the field of subjective judgment. Unsupported by results from controlled experiments, such subjective evidence might be of little value; but as one phase of a complete investigation it seems to the writer to assume considerable importance.

To secure such evidence, the writer was able to obtain the coöperation of the principal and two teachers of the sixth grade in Public School 6, Hackensack, New Jersey. The experimenter ascertained what material would be covered in geography for the succeeding eight weeks; he then made study questions on this subject matter and sent them to the school. He had previously discussed the possible value of such exercises with the teachers, but his only instructions were to use the material as they saw fit. The study questions are given in Appendix II.

No attempt is made to give objective results of this work, because such results were obtained elsewhere, and the purpose of the course of procedure at Hackensack was to secure subjective, not objective, data. The joint report of the two teachers who participated in the study is given below. It is interesting to remember in reading this statement that when the experimenter first discussed the study questions with the teachers, one of them was most doubtful of their value while the other was actively hostile.

"It has been our experience in the past that geography assignments to be studied from the text were poorly prepared, the fault seeming to lie with the assignments rather than with the pupils who struggled with them. Although the student did his conscientious best the facts were simply not forthcoming at the recitation period. Upon investigation and careful study of the situation there seemed to be several reasons for this.

"When an assignment was given which required a study of the text in order to solve a problem, any one or a combination of the following conditions resulted. In the first place it frequently developed that some of the most important facts had been overlooked. Those important facts that were found were not always seen in their proper proportion, the child in his inexperience confusing them with points of lesser value to the solution of the problem in hand. Sometimes the child's study yielded data correct enough in their place but bearing absolutely no relationship to the question under discussion. We were expecting from the pupil an almost adult ability at taking and organizing notes with no previous training.

"The recitation period was approached with a feeling of uncertainty and often ended in the same way. The tendency was to let the willing horse work, and the lesson advanced through the efforts of a few. There seemed to be no pride in having done a good task well. Those who were not well prepared felt that they had skimmed through neatly; those who had carried the lesson felt indignant at doing all the work. Dissatisfaction arose too from the fact that the child who had really tried to study had brought in irrelevant material which was not usable. He had had no criteria by which to judge his study, and no means of knowing when he had accomplished what was required of him or, indeed, whether he had accomplished it at all. In other subjects his study work had definitely scorable results by which he could tell where he stood; in geography he was helpless. Owing to his dissatisfaction at the turn of events, or because of his lack of proper preparation, his interest lagged, flickered, and went out. This condition was more or less general.

"One of the causes of the difficulty found in preparing study assignments from the text was the fact that the organization of the textbook, covering, as it must, large units of work, did not readily lend itself to the smaller units of study demanded by the type of assignment necessary to problem-solving, and there was confusion and loss of time in having to read the entire text. The questions which were found in the textbooks did not parallel the reading matter and were more suitable for review or for guiding supplementary reading than for initial study. Furthermore, the problems around which the author had organized his material frequently were not similar to the problems raised by the children, and information bearing upon the problem being solved by the pupils was difficult to obtain.

"Since there was little interest in the lesson and less satisfaction from the preparation of it, it was only to be expected that the retention of a lesson was a minus quantity resulting in further dissatisfaction. It took tremendous interest and enthusiasm on the part of the teacher to say nothing of a wide knowledge of the subject matter to keep the lesson from becoming the acme of boredom.

"A complete review of the curriculum made us conscious that results in

subjects, such as arithmetic, spelling, reading and penmanship, in which definitely scorable results were obtained, were infinitely better than results in geography or history where such questions were not used. Would definitely scorable study questions on the text increase the efficiency of the pupil in learning and retaining the geography lesson? It seemed worth trying.

"In using the study questions we first tried them, class against class on equally divided sections of the text. Each class was without the questions that the other class had. This was followed by a true-false test on the entire section. The scorable results were not conclusive owing to the recitation factor, but interest in geography had received a stimulus and the children wanted questions for the entire unit studied.

"Next we tried the study questions in this way. One class was divided into Teams A and B. The equal division was made with the help of geography ratings plus pupils' intelligence quotients.

"As a means of collection of facts preparatory to work on the problem on Siberia, assignments to text reading were given. Team A had study questions. Team B did not. There was no discussion of the reading. In a true and false test which followed, Team A reached a very much higher average than Team B.

"What was more significant than the conclusive results of this experiment was the fact that Team B begged that it might be allowed to re-read the text using study questions and then to compete with Team A in a similar test. As an added reason the pupils gave the argument that they would be better prepared to solve the coming problem if they had previously answered the study questions as an aid in remembering the facts.

"By way of further experiment the class was given the study questions for a new unit, and the first few days given over to the preparation and discussion of answers. Then the problem was set. Owing to some previous knowledge of the subject a better problem was arrived at in shorter time. The pupils were delighted to find how much of the problem they could already answer, and the sections requiring more study or the use of reference material were more quickly recognized and more enthusiastically attacked.

"After an eight-weeks trial we found that conditions had improved considerably, the most striking feature being the interest of the pupils who were demanding study questions when they were not available. They were more satisfied with their lessons because they could find without undue difficulty all the facts necessary to enable them to participate freely in the lesson. The fact that the preparation could be scored increased their responsibility and appealed to their competitive instinct.

"At the conclusion of the experiment a class vote for an opinion on the questions resulted in a response of fifty pupils favoring the questions and two against them. Some of the reasons given for liking the questions were:

1. The questions could all be answered from the text.
2. The pupils could get better grades.
3. The questions called attention to what was read.
4. The questions made studying more interesting.
5. The questions required thought.
6. The things you needed to know were found more easily.
7. The questions were interesting because they were like puzzles.

8. After answering the questions it was easier to remember them.
9. The pupils knew they were getting what they wanted.

"The two who voted against the questions gave as their reason the opinion that the wording of the questions was too difficult.

"From the teachers' standpoint the questions proved valuable because they could be fitted to a more limited assignment and could be made to run parallel to the students' problems. They also put the facts to be learned in the proper proportion. Besides furnishing the facts needed for the solution of the problem, it was also a means of covering all essentials which might not have come under the problem.

"The chief danger seems to be that the questions and the resulting advantages from their use are too good and the temptation is to use them to the exclusion of other teaching methods."

CHAPTER VIII

SUMMARY OF FINDINGS AND THEIR APPLICATION

In order to secure the completely controlled conditions which are necessary in such a series of investigations as has been described, it is almost impossible to avoid creating certain artificial situations which would not obtain in ordinary schoolroom procedure. Although unavoidable in many cases, such conditions may well be recognized by the experimenter, and a statement of them included in the summary of his investigations.

The writer believes that three such factors have entered into his work. The first is implicit in the rotation experiment procedure. Since Class A, for example, has the study-question method this week and the traditional method next week, may there not be some transfer of method from one week to the next? There was no attempt to secure data on this point, and the evidence from the two schools where the work lasted for six weeks is contradictory. At the Speyer School, the first E.C. was .739, the second, .17 and the third, 1.57. Had there been transfer of method, the two groups would have become closer as the experiment proceeded. On the other hand, at Public School 43, which used the same materials, the E.C.'s were .59, .65, and .19, the final one being the smallest as would have been the case if transfer had taken place. In some of the study periods in which the control method was used, the experimenter noticed that some of the pupils were taking notes, which might be interpreted as some slight evidence of transfer of method.

The facts probably are, however, that six weeks is far too short a period to produce any change in methods of study which had been built up through several years of school experience. No attempt was made to insure transfer by discussing the values of the two methods. Were the study-question method tried over a period of years, the question of transfer might be readily tested.

The second factor which makes the experimental conditions artificial consists in the fact that the children knew that the work

of the investigation was entirely separate from the regular school routine, and that the scores they received would have nothing to do with their school marks. In addition, they knew that there were to be no recitations in which the subject matter studied would be discussed. Two normal and potent sources of motivation were therefore lacking. Of course, this situation was true of both groups, experimental and control, and the writer has no evidence that the E.C.'s would have been different if greater motivation had been present. Further experimental work over an extended period of time and under a normal school situation can alone demonstrate the truth of the matter.

The third factor in the necessarily artificial situation grows out of the second. Since there were to be no recitation periods, there was no strong motivation to study carefully *all* of the lesson. That is, unless an individual piece of information was specifically called for by a study question, the tendency was, of course, for the pupil to neglect it, since he knew he would not be held accountable for it in a class discussion. The experimenter recognized this fact, and felt forced because of it to include as much of the subject matter of the text in his study questions as he could. This fact should be taken into account in judging the worth of the study questions as questions; for in order to insure a careful reading of all of the lesson, the writer had to include some material which did not readily lend itself to the objectively scorable type of questions. However, he did not feel safe in omitting it, since, as previously stated, he did not make the tests and could not know, therefore, what items of information they would call for.

Before giving the summary of findings, the writer feels that there is some subjective evidence which should be presented in addition to that included in Chapter VII. In the first place, he found considerable trouble in enforcing discipline during the study periods under the control method. The pupils apparently read the assignment through once, and from then on did not know what to do with their time. It did not seem to occur to them to go back over the assignment, raise questions about it, or ascertain and master the important parts. On the other hand, disciplinary problems scarcely entered into the situation during the periods when study questions were used. The boys settled down to work and the only difficulty the writer had was at the end of the hour when he read the correct answers and the score values of the questions.

At this time, the satisfaction over the correct answers was likely to become too vociferous.

All of the teachers who have watched the work of the experiment have spoken favorably of the interest which the study-questions evoke. In one class at the Speyer School at the end of six weeks of work, a vote was taken as to which kind of study the class preferred. The class voted 24 to 6 in favor of the study-question method. At Stamford, the teachers discussed the two methods with the children at the end of the experiment, and noted their comments. Some of these are given here.

"The reason why I liked the study papers was that we got more out of the lesson."

"I like the test papers because they are quicker and more fun."

"They help you to follow the lesson."

"It makes it easier to get 100 per cent."

"It is fun to see how much you know without studying over again."

"I like the study papers because they point out the most important things and they are not easy to forget. It tells you something definite to study."

"I like the study papers because they give us something definite to go by."

For the purpose of summarizing the entire experiment, the writer combined the distributions obtained at all of the schools which participated in the investigation. He again employed the formulæ of Yule and McCall which have been previously described. Table IX, Appendix III, shows the results. The final experimental coefficient is 1.62. Expressed in terms of a statement of chances, this is greater than 65,000 to 1.

There remains the necessity of considering the meaning of these results in terms of school practice. The experimental work seems to show clearly that the use of objectively scorable study questions on the geography text has definitely measurable results. These results seem to be due to the fact that when such questions are used the children react in an active way to the textbook material. As stated in Chapter III the questions lead them to think, reason or summarize on the basis of facts given in the text, to take notes on the material studied, and to amplify quantitative statements through computations which deal with familiar relationships. To induce such reactions improves in an important way the quality of study, particularly in any lesson assignment which involves the reading of the text.

For a long time teachers have been attempting to induce the

sort of reaction in study which is described above; the appreciation of its necessity has been well recognized. The value of the study questions, therefore, does not lie in uniqueness of purpose, but in efficiency in attaining ends of recognized worth.

To determine objectively that the quality of study had been improved, the true-false test was used to ascertain the understanding and mastery of subject matter by the children, with the results indicated above. If we define study as "the work that is necessary in the assimilation of ideas" [1] and accept the true-false test as one method of testing this assimilation, then it must follow that the objectively scorable study questions did improve the methods of study of the children. If this be true, the value of the questions will be recognized by many teachers who are attempting to lead their pupils into better ways of working. So much, then, may be considered as objectively established.

Proceeding now to subjective judgments of the worth of the above facts in elementary school practice, the writer believes that the satisfaction resulting from the objectively scorable character of the questions brings greater interest and effort in study. He is also convinced that the greater control over subject matter which this method produces will be of real service to teachers who are striving to make the recitation period a time for group thinking and problem-solving rather than for testing the knowledge of individuals.

Finally, the study question method seems to offer great possibilities of increasing the efficiency of problem study through preparing children to select a problem intelligently and through furnishing them a guide in the mastery of data for its solution.

The investigator finds a justification for these conclusions not only in his own judgment but also in the corroborative evidence of the statements of the Hackensack teachers who used the study questions in classroom situations for eight weeks, and also in statements from pupils in other schools where the method has been tried.

If the statements be accepted as logical, what can be done to put the objectively scorable questions into actual use in the schools? It is admitted by the writer that the making of the questions requires much time and thought, so that the average teacher is likely to be discouraged at the prospect of framing them

[1] McMurry, F. M., *How to Study and Teaching How to Study*, p. 26.

for her own classes. In this situation, there are three possible procedures.

First, the teacher may make them gradually, having them mimeographed and keeping them from year to year. An attempt has been made in Chapter II to show that the questions are adaptable to different methods of teaching or approaches to subject matter, in which respect they are similar to a good textbook. Keeping them from year to year, therefore, will not have the stultifying effect of keeping lesson plans from year to year.

Second, a city school system in which the same textbooks are used throughout the schools may have one committee of teachers, under the direction of a supervisor, write the study questions for the entire city. They may then be published in handbook form.

By far the best method, however, in the opinion of the writer, is to include the questions as part of the textbook. This may be done through the publication of a study exercise book bound separately, or else the questions may be incorporated in the text itself. In the latter case, the children may be instructed not to write the answers in the book, but to write them on separate sheets of paper.

With regard to this suggestion, reference should again be made to the fact stated in Chapter III that the objectively scorable study questions are not intended to supplant the questions already included in geography texts, in so far as the latter consist of problems for group discussion and thinking, or for the guidance of children in their collateral reading. These should still remain; the objectively scorable questions may be added to help in the mastery of the text.

Such a plan, to be sure, will increase somewhat the size of the textbooks in geography. But the results of the experimental work of this study tend to show that such increase, since it would be of material benefit to both teachers and pupils, would be worthwhile.

APPENDIX

I

STUDY QUESTIONS BASED ON *HUMAN GEOGRAPHY* BY J. RUSSELL SMITH

STUDY SHEET I

Europe is called "the mother of nations." Paragraphs 399 to 405 on pages 203 to 210 in your books tell why, and how the geography of Europe helped it to become the mother of nations.

Read these paragraphs through twice. Then see how many of the questions below you can answer. After you have answered all you can without looking at the book, take the book again, check up on the answers you have written and find the answers to the other questions.

I. Underline the *two* best reasons why Europe may be called the mother of nations.

1. Europe is the smallest inhabited continent except Australia.
2. The people of Europe and the people who have recently gone from Europe rule most of the world.
3. Europe is entirely in the eastern hemisphere.
4. Europeans have settled North America and South America and Australia.

II. Cross out the wrong words.

Europe is the $\left\{\begin{matrix}\text{best} \\ \text{poorest}\end{matrix}\right\}$ continent for making energetic, civilized men. A large part of its land is $\left\{\begin{matrix}\text{good} \\ \text{poor}\end{matrix}\right\}$ for farming and manufacturing.

III. Complete the following sentences by filling in the names of the correct continents.

..... has a smaller cold region than .....
..... has a larger dry region than .....
..... has a smaller wheat and potato belt than .....
..... has a larger corn and cotton belt than .....
..... has a climate which nearly everywhere suits white men.

IV. Cross out the wrong words.

Europe has a shape and surface that $\left\{\begin{matrix}\text{are} \\ \text{are not}\end{matrix}\right\}$ well suited for human life.

There is a {plain / mountain range} through the center of Europe where {farming / mining} is carried on.

V. About how much larger is the average American farm than the average European farm? ..... Does this mean that North America is more or less densely populated than Europe? .....

VI. Underline the best reason why there are many nations in Europe.
1. Europe has three times as many people as North America.
2. European nations have developed a strong national spirit.
3. Many parts of Europe are protected from invasion by valleys, bays, and peninsulas.

VII. Do you think that it would be correct to say that Europe has been the mother of literature, art and music? ..... (Write yes or no.)

VIII. Underline the *two* best reasons why Europe became the mother of nations.
1. Europe is small.
2. Europe has a dense population.
3. Europe has a climate and land surface that are favorable to men.
4. Many parts of Europe are protected by natural barriers.

STUDY SHEET II

Sections 406 to 413, pages 210 to 214 tell about the Green Northlands of Europe. Paragraph 406 tells you what the principal industries of this section are. Write them here. ..... and .....

Why are these the industries of the Green Northlands? Read from section 406 through section 413 with that question in mind. Read these sections twice. Then see how many of the questions below you can answer. After you have answered all you can without looking at the book, take the book again and find the answers to the other questions.

I. Write the names of the islands which lie between Scotland, Norway and Iceland. ....., ..., ..., and .....

II. Underline the best reason why the land in this section is used chiefly for pasturage.
1. There are many cattle and sheep there.
2. The islands are covered with snow in winter.
3. The islands are too wet to plow in the summer time.

III. Fill in the blank spaces.

Partly because of the fact that this region is not suited for agriculture, the chief industry of the people is ..... (look at the picture on page 210). ..... and ..... are salted or dried and exported. The people's houses are made of ..... and have ..... roofs.

IV. Underline the best title for section 407.
1. Summer tourists in northern waters.
2. Why northern waters near Europe are warmer than those near North America.
3. The Gulf Stream.
4. Ocean currents of the Atlantic Ocean.

V. Cross out the wrong words.

Ocean currents make the lands we are studying {colder / warmer} than they would otherwise be. The Gulf Stream flows from the Caribbean Sea and the Gulf of Mexico {northeast / northwest} across the {Atlantic / Pacific} Ocean. This current has {twice / 10 times / 1,800 times} as much water as the Mississippi River.

VI. Mark a T before the sentence below if it is true and an F if it is false.

.... The ports on the eastern coast of Siberia are open longer than those on the western coast of Norway.

VII. Fill in the space below with the words "water" or "earth." Be sure to put the right word in the right space.

..... heats more slowly than .....
..... cools more slowly than .....
..... is warmed to a greater depth than .....
..... holds its heat a shorter time than .....

VIII. Cross out the wrong words.

Iceland {is independent / belongs to Denmark}.
Icelanders are {very intelligent / not very intelligent}.

IX. Would you think of the coast of Norway as a good place to farm? (Write yes or no.)

..... Are Norwegian fjords much like the mouth of the Hudson River? .....

Underline the chief industries of Norway.

Lumbering
Cotton growing
Rice growing
Fishing
Mining

X. Write a T before the sentences below if they are true and an F if they are false.

.... Norwegian ships carry only Norwegian products.
.... Water power will probably be an important factor in the future industrial development of Norway and Iceland.

TEST I

Put a T before each true statement and an F before each false statement.

..... 1 Europe is the smallest of the six continents.

..... 2 North America has a climate more favorable to man than Europe.

..... 3 Europe produces more wheat than North America.

..... 4 Grain crops can be raised in nearly all of Central Europe.

..... 5 Asia is the only continent which has a larger population than Europe.

..... 6 The population of Europe is five times as great as that of North America.

..... 7 The average size of farms in Europe is about 130 acres.

..... 8 The presence of numerous separated, sheltered sections favored the development of many nations in Europe.

..... 9 The development of railroads and transportation made it possible for the United States to become a large, single nation.

.....10 England found it difficult to become a nation because its enemies found it easy to attack England by water.

.....11 It is best to "See America First" because Europe has few attractions for the tourist.

.....12 Most of the world's great art has been produced in Europe.

.....13 Europe has no buildings which were built before Columbus discovered America.

.....14 There are cities in Europe which are two thousand years old.

.....15 Countries like Spain and Italy were developed as separate nations because the mountains along the north protected them from attack by enemies.

.....16 The manufacturing area of Europe is located in the northern and eastern sections.

.....17 Because of the overcrowding of population of Europe, many people have migrated to North and South America.

.....18 The cotton belt in Europe is located in Southern Europe, near the Mediterranean Sea.

.....19 India and the Americas export wheat to western Europe.

.....20 The unfavorable climate of western Europe has caused the population to be most dense on the eastern plain.

.....21 The summers in the Green Northlands are cool and very wet.

.....22 The climate of the Northlands is favorable to the growth of grass crops.

.....23 Grazing is one of the chief occupations of the Northlands.

.....24 The average temperature of any region is determined entirely by its distance from the equator.

.....25 The waters of the Gulf Stream temper the climate of North America.

.....26 Iceland, which lies near the Arctic Circle, has a climate more severe in winter than Canada and northern New England.

.....27 Agriculture is the chief industry of Norway.

.....28 The Icelanders are people of Norwegian descent.

.....29 Fjords are the rich fertile valleys found in the mountains of Norway.

.....30 The Gulf Stream is like a river of warm water flowing through the northern Atlantic Ocean.

.....31 It requires more heat to raise the temperature of water than to raise the temperature of an equal amount of earth, and the water holds the heat longer.

.....32 The coastal plain of Norway most resembles our Atlantic coastal plain.

.....33 The direction of the prevailing winds helps to force the Gulf Stream toward the western coast of Europe.

.....34 The lack of modern agricultural tools is the chief cause of the Norwegians turning to the shipping industry.

.....35 Few fish are found in the cold waters about Norway.

.....36 Norway has made great strides in developing the water power of her rivers.

.....37 Iceland is lacking in water power to develop.

.....38 The people of Iceland are among the most intelligent and best educated people in the world.

.....39 Norwegian shipping has been developed because of the lack of agricultural resources in the homeland.

.....40 Norwegian shipping is engaged chiefly in the export and import trade for her own country.

STUDY SHEET III

The United Kingdom

At the time that Columbus discovered America, the British Isles were largely engaged in farming. Now they represent the greatest manufacturing center in the world. How did this change come about? Read from section 414 through section 423, pages 214 through 218, and find out the answer. Read these sections twice. Then see how many of the questions below you can answer without looking at the book. After you have answered all you can, take your book and find the answers to the others. *Read the text through twice before you begin answering the questions.*

I. Write the correct names under 1, 2, and 3.

1. England, Scotland, and Wales.

.....

2. England, Scotland, Wales, Ireland, and small islands.

.....

3. United Kingdom and its possessions.

.....

II. Underline the effect of the ice sheet (glacier) on the British Isles.
1. Made the country cold.
2. Deposited coal and iron.
3. Made many lakes.

III. Cross out the wrong words.
The mountains in the British Isles are in
1. Southern Scotland.
2. England.
3. Wales.

IV. Underline the reason why Ireland and England were once like each other.
1. About the same size.
2. Swampy.
3. Mountainous.

V. Underline what the surface of Ireland reminds you of.
1. A plate with a turned-up edge.
2. A flat piece of tin.
3. A high mountain.

VI. Underline the correct answer.
Dr. Huntington says the energy of the British people is due to
1. The cold climate.
2. The Gulf Stream.
3. Frequent changes in climate.

VII. Remember your lessons last week about the effect of the Gulf Stream on the western coast of England. Cross out the wrong words below.
The summers in England are $\left\{\begin{matrix}\text{cool}\\\text{hot}\end{matrix}\right\}$, and the winters are $\left\{\begin{matrix}\text{warm}\\\text{cold}\end{matrix}\right\}$.

VIII. Underline the products for which the English climate is suited.

Corn	Rye	Potatoes
Wheat	Small grains	Tobacco
Cotton	Sugar	Garden vegetables

IX. About how much greater is the British yield per acre of wheat, than that in the United States? ..... Is England growing more or less wheat than she did 100 years ago? ..... Write after this sentence the two industries which have taken the place of wheat growing in England. 1..... and 2.....

X. Fill in the blank spaces.
The climate of Ireland is too ..... for wheat. The chief agricultural products are ....., and ....., and ..... Houses are built of ..... The people burn ..... in their fires.

XI. If you drove through Ireland, what farm animals would you expect to see?

1. ..... 3. .....
2. ..... 4. .....

XII. Cross out the wrong words.

In 1492 the richest men in England lived in {northeastern / southwestern} England.

Their chief industry was {manufacturing / farming}.

XIII. Fill in the blank spaces.

BEFORE THE INVENTION OF THE STEAM ENGINE

1. The power for weaving was ..... power.
2. Cloth was made in .....
3. Towns were .....in number.
4. Grain fields had denser .....

AFTER THE INVENTION OF THE STEAM ENGINE

1. The power for weaving was .....
2. Cloth was made in .....
3. Towns were ..... in number.
4. Coal fields had denser .....

XIV. Cross out the wrong words.

The coal fields in the United States are {near / far from} the sea, while those in England are {near / far from} the sea.

Coal fields are busy centers of {manufacturing / agriculture}.

The position of the coal fields made it {easier / harder} for Great Britain to get {raw materials / finished products} and to send out {raw materials / finished products} to other countries.

XV. Underline the two best reasons why Manchester became the greatest manufacturing center in the world.

1. It is near the sea.
2. It has a damp climate.
3. It is in Lancashire.
4. One can hear spinning machines there.

XVI. The average schoolroom is about thirty feet long.

The amount of cotton which Great Britain manufactures for every person in the United States would go how many times across such a room? .....

XVII. Write below the three other textiles which the British Isles manufacture. Write in the next space one city which manufactures it. Write in the third space one use to which you have seen this textile put.

1. ....
2. ....
3. ....

STUDY SHEET IV

Remember our problem for the last lesson, "How did Great Britain become a great manufacturing center?" Now add this problem, "What is the character of life in Great Britain today?" Read from section 424 through section 439, pages 218 through 224 with these two problems in mind. Read this through twice. Then see how many questions below you can answer without looking at your book. After you have answered all you can, open your book again and find the answers to the others. Do not begin to answer the questions below until you have read the lesson *twice*.

I. Write one manufactured product after each city.
   1. Birmingham .....
   2. Sheffield .....
   3. Newcastle .....
   4. Glasgow .....

II. Underline the *two best reasons* why England is the greatest manufacturing center in the world, especially for ships.
   1. England has many good harbors.
   2. There is plenty of coal there to run the shipyard machinery.
   3. England leads the world in commerce.
   4. England has many colonies.

III. Cross out the wrong words.
   The Clyde River is {the greatest / one of the greatest} shipbuilding center(s) in the world. Belfast is a center for {mining / shipbuilding}. British coal is used for smelting {many / only iron} ores.

IV. Underline the best title for section 425.
   1. The many people who live in English cities.
   2. How Garden Cities in England are making city life pleasanter.
   3. How cities make men unfit for military service.
   4. How a stenographer started a garden city.

V. Cross out the wrong words.
   The winters in England are {too cold / suitable} for football.
   Other sports are played in the {cool / hot} summers.

VI. On the left of the page are some facts about England. Below this are the results of these facts. Select the correct result for each fact and write it in the blank space after the fact.
   1. Sea boundary between England and Europe .....
   2. Many drowned valleys like Hudson River .....
   3. British factories produce goods for foreign countries .....

   Results:
   Great Britain is a great importing and exporting center.
   Great Britain has been able to keep out of wars.
   Excellent harbors for shipping and trade.

VII. Write in the blank spaces "To Eng." before things that are imported into England and "From Eng." before things that are sent out of England.

.....Butter	.....Cheese
.....Cotton cloth	.....Rubber
.....Lumber	.....Knives
.....Machinery	..... Coal (in large amount)

VIII. Would a British harbor look much like downtown New York?.....

IX. Write the name of the greatest trade center in the world .....

X. Underline the best description of an "entrepot."
1. A place where goods are brought into a country.
2. A place where goods are imported from one country and exported to another country.
3. A place from which goods are exported.

XI. Write a T or an F in front of these sentences.
.... England has a small carrying trade.
.... The quickest way to go from New York to Russia is through England.
.... The English are not an energetic people.

XII. Underline the best title for section 437.
1. How England has come to hold large foreign investments.
2. English financiers abroad.
3. Ranches in Australia and diamond mines in Africa.
4. London as the world's greatest banking center.

XIII. Write below three ways by which the English have gotten possession of new countries. After the last way, write the name of a man who added to the Empire in that way.
1. .....
2. .....
3. .....
4. ....

XIV. Underline the three things which give the greatest promise for the future of England.

Agriculture	The climate of the country	Oil production
Coal deposits	Grazing	Cattle breeding

TEST II

Put a T before each true statement and an F before each false one.

.... 1. England, Scotland, Wales and Ireland form the British Empire.
.... 2. Because of her climate, England produces much wool.
.... 3. There are many mountains in southeastern England.
.... 4. Ireland has rough, rugged surface like that of Scotland.

.... 5. Rapid changes of weather cause people to feel energetic.

.... 6. Many of the cyclonic storms from the United States pass over the British Isle.

.... 7. Ireland has a cool, damp climate.

.... 8. Corn is raised in great abundance in Ireland.

.... 9. Ireland is called the Emerald Isle because of the peculiar color of the soil.

....10. The mild climate of England is determined largely by her nearness to the equator.

....11. The English produce a greater number of bushels of wheat to the acre than we do here in the United States.

....12. Much of England is devoted to dairy farming.

....13. Farming is the chief industry of Ireland.

....14. Before the development of machinery, England was a great manufacturing center in Europe.

....15. The development of power machinery took the weaving of cloth out of the homes where it had been done before.

....16. Many of England's coal mines lie near the sea.

....17. Manchester is the chief cotton manufacturing center of the world.

....18. Because of the damp climate, great difficulties are encountered in weaving cotton and linen in the British Isles.

....19. In Ireland most of the weaving is still done in the homes, especially around Belfast.

...20. The manufacturing centers are located largely along the eastern coast of England.

....21. Sheffield is the center of the manufacture of cutlery.

....22. England is exceeded by the United States in the amount of shipbuilding she does.

....23. Great Britain imports coal from the United States and Italy.

....24. Most of the people of the British Isles live in cities.

....25. The climate of England is too severe for out-door sports in the winter.

....26. England's location near the mainland of Europe has helped her to become a great trading nation.

....27. Much of the coast of the British Isles is bleak and forbidding like that of northwestern North America.

....28. British prosperity depends on the trade which her steamship lines and manufacturing make possible.

....29. England is the greatest trade center of the world.

....30. American manufacturers go to England to buy raw products produced in many distant countries.

....31. New York City is a greater trade center than London.

....32. England has invested large sums of money in foreign countries.

....33. London is regaining her position as the world's greatest financial center.

....34. The British are a home-loving people who do not like to leave the mother land.

....35. England is fast approaching her limit of growth in wealth and population.

....36. Agriculture is the chief industry of the British Isles.

....37. The abundance of coal in the British Isles enables the people to engage in manufacturing.

....38. The energy of the British people has built up an empire greater than the United States and all her possessions.

....39. England produces most of the food needed to support her population.

....40. The British government has extended its boundaries in the interest of trade.

STUDY SHEET V

Turn to the regional map on pages 204–205. Find section C of this map. Section C includes parts of Germany and France and all of Belgium and Holland. The green parts of this map are very low in altitude. Notice that *all* of section C is low.

Because they are low, that is, near sea level, these countries have certain problems which are different from those of England about which you have just been studying. What are these problems and how do the people solve them? Read from section 440 through section 445 and find out. Read these sections through twice. Then see how many of the questions below you can answer without looking at your book. After you have answered all you can, open your books and find the answers to the others.

I. The Low Countries are the delta of the Rhine River. Underline the best explanation below of how a delta is formed.
   1. The sea fills in the land.
   2. The glaciers make it.
   3. A river carries sediment and deposits it near its mouth.

II. The Low Countries are remarkable for two things. Write them below.
   1. .....
   2. .....

III. The Lowlands have two advantages. Write them below. Then write in the next space the two industries for which these advantages are a help.
   1. ....
   2. ....

IV. Underline the phrase which tells what Dutch windmills do.
   1. Pump water from fields into the sea.
   2. Run cotton mills.
   3. Run dredges to deepen the rivers.

V. Underline the best title for section 442.
1. Agriculture in the Low Countries.
2. How the Low Countries make the most of their land.
3. Raising potatoes in the Rhine Valley.

VI. An acre of wheat in Belgium yields about how many times as many bushels as an acre in the United States? . . . . . An acre of potatoes in Holland yields about how many times as many bushels as an acre in the United States? . . . . . .

VII. Underline three other products of the Low Countries.

Sugar beets	Cheese	Tobacco	Oats
Corn	Rice	Butter	Flower bulbs
Cotton	Forage beets	Rye	

VIII. Underline the best reason why the same people in the Low Countries engage in both manufacturing and farming to a greater extent than they do in Great Britain.
1. There is more farm land in Great Britain.
2. There is less coal in the Low Countries than in England.
3. Raw products are produced more in the Low Countries.

IX. What do we call people in this country who work in a city and live in the country, traveling to and from the city by train?

. . . . . .

X. Underline the best reason why the Rhine Valley which ends in the Low Countries is like the Hudson River.
1. They are both important rivers.
2. Both rivers allow shipping to enter easily into the Atlantic Ocean.
3. Both rivers form a trade route from important sections within a country to a great ocean.

XI. Below on the left are three problems which the Low Countries have to face. Below these are three ways that the Low Countries use to solve these problems. Select the right solution for each problem and write it in the blank space.

Problems.

1. Rivers fill up with sediment. . . . . .
2. More dock room needed. . . . . .
3. Hard to build roads in damp countries. . . . . .

Solutions.

Use canals for roads.
Building greater docks.
Dredge rivers and make dikes.

STUDY SHEET VI

In our last lesson we learned of some of the problems of the Low Countries of Europe. This lesson tells how a great manufacturing center has been built up there. Read sections 446 through 451 and find out about it. Read these

sections through twice. Then see how many of the questions below you can answer without looking at your book. After you have answered all you can, open your book and find the answers to the others.

I. Underline the best reason why the harbors of the Low Countries are called a Gateway Region.
   1. Antwerp, Rotterdam and Amsterdam are busy places.
   2. Every day ships unload there.
   3. Antwerp is a great *entrepot.*
   4. Goods enter through these ports and are reshipped to the interior of Europe.

II. Underline the kind of products which are traded in *most extensively* in the Low Country ports.
   Tobacco, cinnamon, grain, cotton, lumber and other raw products, ivory.

III. Cross out the wrong words.
   A {large / small} region is served through the ports of the Low Countries. Merchandise is shipped in {ocean vessels / Rhine boats} as far as {Italy / Switzerland}. They bring back to the ports {raw materials / manufactured goods} to be shipped abroad. Belgium {exports / imports} coal to other lands.

IV. Summarize in *two words* each of the four advantages of the Low Countries for manufacturing.
   1. ..... 2. .....
   3. ..... 4. .....

V. Underline the best reason why the factories of the Low Countries are like those of England.
   1. Both are very important.
   2. Both use raw materials.
   3. Both import their raw materials.

VI. Fill in the blank spaces.
   The landscape in Holland and Belgium is like a procession of..... ..... Iron ore for factories comes from the province of .... in the country of ..... The greatest iron manufacturing region is near ..... The ..... River carries the ore to the famous ..... Works, which formerly manufactured guns. Now this plant manufactures .....

VII. Write below the names of four great textile centers.
   Write after each one the country in which it is located.
   1. ....
   2. ....
   3. ....
   4. ....

VIII. Write below three manufactured products for which much coal is used in the Low Countries.
1. ..... 2. ..... 3. .....

IX. Write below the names of three great manufacturing cities of Belgium.
1. ..... 2. ..... 3. .....

X. Write below the names of two important products of the Low Countries which show how intensive manufacturing is carried on. Underline the one which is manufactured in homes of the people.
1. ..... 2. .....

XI. Underline the best reason why Holland imports stone and logs from Norway and Sweden.
1. There are great quarries and lumber yards in Scandinavia.
2. Stones and logs are used in making dikes.
3. Holland does not have enough stone and logs for her needs.

XII. Underline the best reason why the people of the Low Countries speak several languages.
1. They are well educated.
2. Several languages were developed in the region of the Low Countries.
3. Four nations which speak different languages live very close together.

XIII. Cross out the wrong words.

The people of this section are {lazy / industrious}.

Although the region is very small, it has {more / fewer} people than all of New England. Holland and Belgium are {absolute / limited} monarchies where the people have {little / much} voice in the government. These two countries have {many / few} colonies.

XIV. Underline the greatest possibility for future development in the Low Countries.
1. Trade and manufacturing.
2. Agricultural pursuits.
3. Grazing.

TEST III

Put a T before each true statement and an F before each false one.

..... 1. In the Low Countries, the rivers flow through narrow valleys cut deep below the surface of the land.

..... 2. The lower Rhine valley is the greatest manufacturing region of the mainland of Europe.

..... 3. The Low Countries have taken much land from the sea by building dikes and pumping out the water.

..... 4. The land won from the sea is not of very high quality.

..... 5. Windmills are used for pumping out the water in the Lowlands.

..... 6. Farmers in the United States make more money per acre than those in the Lowlands.

..... 7. Much rice is raised in the Lowlands, which are too wet for other crops.

..... 8. The Dutch use much Canadian butter and oleomargarine because they do not produce enough to supply their own needs.

..... 9. The potato yield per acre in the Lowlands is higher than that in America.

.....10. The Dutch farmers raise tulips and hyacinths because they are a flower-loving people.

.....11. Germany has more experimental stations for agriculture for her size than the United States has.

.....12. Because of the lack of fuel for manufacturing, the Low Countries have encouraged farming.

.....13. Farming is the most important industry in Belgium.

.....14. The Rhine River forms a great trade route to the base of the Alps.

.....15. The flat country and many rivers make travel very easy in the Low Countries.

.....16. Little work has been done on the Rhine River to make it navigable.

.....17. The canal system of the Low Countries is much less extensive than that in New York State.

.....18. The mouth of the Rhine River opens on one of the great trade routes of the world.

.....19. The Low Countries have spent much money improving their harbors.

.....20. Only horses are used to pull the milk wagons in Holland and Belgium.

.....21. Antwerp has the greatest *entrepot* trade of any European country.

.....22. The great majority of the trade of the Low Country ports is in manufactured goods which are being shipped to all ports of the world.

.....23. Antwerp is the chief ivory market of the world.

.....24. The United States ships much food and raw materials to the Low Countries.

.....25. Belgium exports much coal.

.....26. The high state of development of agriculture has checked the growth of manufacturing in the Low Countries.

.....27. The climate of the Low Countries is much like that of Eastern Canada.

.....28. Belgium is the only country in this region which produces coal.
.....29. The factories of this region import most of their raw materials.
.....30. Essen is at the center of the iron producing regions.
.....31. The Krupp works now produce some of the world's greatest guns.
.....32. The factories of the Low Countries are so busy manufacturing iron goods that they do not have much time for textiles.
.....33. Amsterdam is the world's greatest diamond center.
.....34. Holland exports large quantities of stone and logs.
.....35. It is necessary for the business people of this region to be able to use many languages.
.....36. Holland and Belgium have a population greater than that of New England.
.....37. Holland and Belgium together have a larger area than Texas.
.....38. The cities of this region are noted for their neatness and industry.
.....39. Siberia is the largest colony of Belgium.
.....40. The people of the Low Countries are dependent for prosperity and future growth on the foods and raw materials imported from abroad.

STUDY SHEET VII

The Great Atlantic Plain of France

Turn to the map on pages 204–205. Look at the great green section of France. Green on this map means that the country is low. Sections 452–459 describe this region. Read these through twice. Then see how many of the questions below you can answer without looking at the book. After you have answered all you can, open your book and find the answers to the other questions.

I. Cross out the wrong words.

The great plain of the French Republic slopes {east / west} and {northeast / northwest} toward the sea. It is a {manufacturing / agricultural} section with {few / many} cities. The climate is warmer than that of England, though much {like / unlike} it. This section has {little / much} coal. It supports itself through {agriculture / manufacturing}.

II. Cross out all the wrong sentences.

1. The French people rent their farms.
2. The French farmers live in little villages.
3. The French farmers each own a few acres.
4. The French farmers live on their farms.

III. Look at the picture on page 235. Underline the best reason for the different colors.
1. The soil is of different colors.
2. The crops have different colors.

IV. Underline the most important kinds of animal breeding in France.
Horses Sheep Swine Cows Goats

V. Write below the names of the cities near which the chief wine districts are located.
1. ..... 2. .....

VI. Write three of its chief products after Brittany, and one after Normandy.
1. .....
Brittany 2. ..... Normandy 1. .....
3. .....
What is the name of the popular song which will help you to remember Normandy's chief product? .....

VII. Write an F before the sentences below which are especially true of the people of France and an A before those which are true of the people of America.
....1. Save money and put it in the bank.
....2. Make good dishes to eat, out of left-overs.
....3. Waste much food.
....4. Pack vegetables in wooden crates which are later thrown away.
....5. Use willow baskets for vegetables, which are made by the people themselves.
....6. Get two crops, one of vegetables and one of nuts from the same land.
....7. Careless of forest reserves.

VIII. Underline the best reason why pine trees keep the sand from blowing inland and burying the forests.
1. The pine trees produce turpentine.
2. The trees hold the water in the soil.
3. The roots of the trees hold the sand from blowing.

IX. In figures 372 and 374 there are shown three artistic things which are mentioned in the first two paragraphs in section 456. Write their names below.
1. ..... 2. ..... 3. .....
Now write below the name of the kind of artistic work which is mentioned in these paragraphs but which is not shown in these pictures.
1. .....

X. Below are the names of three cities of France. Write after each the most important thing for which it is noted. Write two things if you want to.
Paris .....
Limoges .....
Rheims .....

XI. Turn to the map on page 204, and find Bordeaux and Havre. Put the name of the body of water on which each is located after their names below. Then write in the next spaces two important products which are handled by Havre and one by Bordeaux.

Havre ..... 1. .....
2. .....
Bordeaux ..... 1. .....
What city has direct communication with Paris? .....

XII. Cross out the wrong words.

The Atlantic plain of France is {well / poorly} equipped for trade. {Canals / Bays / Rivers}

connect France with great coal fields.

XIII. It takes about twenty-four hours to go from New York to Chicago. About how many times as long is this as the time it takes to go from London to Paris? ..... Would the service by airplane take longer or shorter? .....

XIV. Underline the best definition of a centralized government.

1. A government of a republican form.
2. A government in which much power is given to one centralized authority.
3. A government in which much of the power is in the hands of the separate counties, cities and districts.

XV. Underline below the sections where France's chief colonies are. Underline twice the ones where white men can live.

1. North Africa
2. Central Africa
3. South Africa
4. North Asia
5. Central Asia
6. Southwestern Asia
7. Southeastern Asia

Underline the activities which promise most for the future of France.

Agriculture.
Manufacturing large iron and steel products.
Water power.
Manufacturing light, fine articles of iron and steel.
Grazing.
Commerce.
Mining.

STUDY SHEET VIII

The Great Plain of Central and Eastern Europe

We are now going to study about a continuation of the plain of France. This continuation runs east to the edge of Europe and on into Asia. Turn to the map on page 204. Plains are green on this map. Follow the plain from Amsterdam to Berlin, to Warsaw, to Moscow.

What kind of people live on this plain, and what do they do for a living? Sections 460 through 466 tell you about some of them. Read these sections through twice, then see how many of the questions below you can answer. Then find in your book the answers to the other questions.

I. Cross out the wrong words.

The great central plain of the continent of Europe is {flat / hilly}, the tallest things on the landscape are {mountains / church spires}. There are {many / no} fenced fields. There are {no / a few} forests.

II. The spaces below are for the five means of transportation on the great plain. One of them is given.

1. Arms of the sea. 3. ..... 5. .....
2. ..... 4. .....

III. Turn to the map on page 204. Find the Volga River. Canals which run from it to the Baltic sea would run in what direction?.... .....

IV. Cross out the wrong words.

As one goes from west to east on the great plain, winters become {colder / warmer}, the summers become {hotter / cooler} and the rainfall {more / less}.

V. Write after each section of the great plain another section of the world which resembles it in climate.

1. Western section .....
2. Central section .....
3. Eastern section .....

VI. Underline *once* the products of this plain. Underline *twice* the three most important ones.

Rye	Sugar cane	Rice	Spring wheat
Oats	Beets	Potatoes	Barley
Cotton	Tobacco	Corn	

Is there any grazing on this plain? .....
Where? .....

VII. Underline the best reason why the central plain is now the home of many different peoples.

1. In ancient times, many men travelled with flocks and herds on the plain.
2. It is a good country for agriculture and grazing.
3. In ancient times, many different people lived in this region and their descendants live there today.

VIII. Underline three ways in which the Scandinavians resemble each other.

1. They are tall, blond people.
2. They live near each other.
3. They have the same sort of industries.
4. They speak similar languages.
5. They are living in the same country.

IX. Is there a section of the United States near this school which has a climate like that of Denmark? ..... Where? .....

X. Underline the chief products of Denmark.

Eggs	Tobacco	Wheat
Corn	Butter	Oats
Rice	Hogs and pork	Barley

XI. There is an interesting story about selling bad eggs in section 465. Have you read it carefully? What happens to the man who sells three bad eggs? .....
Is the coöperative organization of the farmers a government institution? .....
Who runs it? .....

XII. Look at the statement in the book of the places to which Denmark sends its butter. Then look at the map on page 8. Which country to which the Danes sell butter is the farthest from Denmark? .....

XIII. Write below in the first six spaces the kinds of feed the Scandinavians use for their cows. Underline the ones they get from other countries. In the last three spaces write the three other agricultural products grown in Scandinavia. Put a question mark after the one grown the least.

1. ..... 1. .....
2. ..... 2. .....
3. ..... 3. .....
4. .....
5. .....
6. .....

XIV. What part of this country does Scandinavia resemble? .....
Does the same reason account for the resemblance? .....
What was it? .....

XV. Write below two manufactured products of Scandinavia. Underline the one which is worth most in proportion to its weight.

1. ..... 2. .....

XVI. Underline two things below in which Scandinavian capitals are like New York.

1. Dirty
2. Clean
3. Manufacturing done there.
4. Very large.

XVII. What are the governments like the Scandinavian ones called? ....
.....

TEST IV

Put a T before each true statement and an F before each false one.

..... 1. The French peasants own their farms instead of renting them.
..... 2. The farmers live on their farms.
..... 3. Many different crops are raised.
..... 4. Little live stock is raised in France.
..... 5. Much wine is made in France.

..... 6. Large coal fields have made France chiefly a manufacturing country.
..... 7. Brittany is much like Wales.
..... 8. The French people are careless in their use of money.
..... 9. Much material that is wasted in America is put to practical use in France.
.....10. The French made good use of their land.
.....11. The French people are very artistic.
.....12. Beautiful cathedrals are found only in the largest cities.
.....13. Many of the cathedrals took hundreds of years to complete.
.....14. Paris is noted for its beauty and its art.
.....15. Paris is lacking in railroad facilities.
.....16. Art has not influenced the trade of Paris.
.....17. France exports chiefly raw materials.
.....18. The government of France is more highly centralized than ours.
.....19. The French colonies are largely peopled by French settlers.
.....20. France is now making a rapid industrial growth.
.....21. The Great Central Plain of Europe extends in the same direction as that in North America.
.....22. This plain is frequently broken by small ranges of mountains.
.....23. This plain is adapted to transportation.
.....24. Water transportation is available here.
.....25. The winters on this plain are very mild.
.....26. Many food crops are raised on the central plain of Europe.
.....27. In ancient times this section was unknown to man.
.....28. Many different nationalities live there now.
.....29. The climate of the Scandinavian countries has tended to make the people lazy.
.....30. Coöperative marketing has done much to aid the Danish farmers.
.....31. The Scandinavians care little for education.
.....32. Norway has much rich farm land.
.....33. Much manufacturing is done in Norway.
.....34. Sweden manufactures some fine steel products.
.....35. The Scandinavians keep many cows because they can raise food for them so easily.
.....36. The Norwegians, Swedes and Danes are much alike.
..... 37. Electric power is coming into use in these countries.
.....38. These countries are republics in their government.
.....39. The people have much power in the government of these countries.
.....40. Most of the Scandinavian cities are unattractive.

STUDY SHEET IX

Last week we studied about four countries on the great plain of Central Europe. This week we are going to study about six more. One of them is very advanced in education and manufacturing; four of them are new countries and one is very backward. Our lesson for today is from section 467, pages 240–244. Read this lesson through twice, and then see how many of the questions below you can answer without looking at your books. After you have answered all you can, open your books and find the answers to the others.

I. What proportion of the German people live in the central plain of Europe? .....Cross out the words below which *are not* true of the German people.

Lazy. Well educated. Good agriculturists.
Ignorant. Good in manufacturing.

II. Put a T before the true statements and an F before the false ones.

.....The German people eat large amounts of potatoes.
.....The German soil has always been very good soil.
.....The German soil is not good for wheat.
.....The Germans eat more wheat than rye bread.

III. Underline the crops below which are raised in Germany and which are good food for both animals and people.

rye potatoes barley oats

IV. Cross out the wrong words.

German universities before the war were {very fine / poor}.

They were particularly prominent in their teaching of {chemistry / history / geography / physics}.

Therefore the Germans became great experts in {history / chemical dyes}.

Germans have written {fair / excellent} scientific books and also {excellent / fairly good} music.

V. Coal is found in Germany near what city? ..... What does this lead you to believe is the leading industry of this region? .....

VI. There are four great German cities mentioned below. You should remember them. Write one leading industry after each one.

1. Leipzig..... 3. Chemnitz.....
2. Breslau..... 4. Dresden.....

VII. Look at the map on page 242 and find Berlin. What do the black lines leading away from the city represent? ..... Underline below the chief things for which Berlin is noted.

1. Railroad center.
2. Largest city in all Europe.
3. Capital of Germany.
4. Very little trade.

VIII. Underline the reasons why New York and Berlin are alike.
1. Many public playgrounds.
2. Capitals of their countries.
3. Many apartment buildings.
4. Many one-family houses.

IX. Find the Kiel Canal on page 242. It is northwest of Berlin. Write below the names of the two bodies of water which it connects.
1. .....
2. .....

X. Cross out the wrong words.

Germany before the war had {little / much} foreign trade.

The Germans {imported / exported} raw materials and {imported / exported} manufactured goods.

XI. The four new countries since the war are described in section 472. Find them on the map on page 242. They border on the Baltic Sea. Write their names in order, putting as number 1 the farthest north, and as number 4 the one that is farthest south.
1. .....
2. .....
3. .....
4. .....

XII. Underline what the World War did for Poland.
1. Divided it up among Russia, Prussia and Austria.
2. Reunited it after 100 years of oppression by foreign rulers.

XIII. Underline the two most important reasons why the countries of the Letts, Lithuanians and Esthonians are alike.
1. They are not great nations.
2. They were formerly under the oppressive rule of Russia.
3. They were given independence by the World War.
4. They are about the same size.

XIV. Underline the two best reasons why the new Baltic States do not grow as good crops as the Germans do.
1. The land in the Baltic States is poor.
2. They have not had as much education or help from the government as the Germans have.
3. They are more interested in manufacturing than in agriculture.

XV. What proportion of the Russian people cannot read or write?.....
Underline the best reason for this.
1. The people do not want to learn to read and write.

2. The former Czar and his friends wanted the people to remain ignorant.
3. The people do not have many schools.

XVI. Put an R before the statements below which are true of Russia and a D before those which are true of Denmark.

.....1. Villages well governed.
.....2. Villages neat and clean.
.....3. Poor village government.
.....4. Fields yield large crops per acre.
.....5. Villages dirty with muddy roads.
.....6. Homes have dirt floors and straw roofs.

XVII. Underline the statements below which are true of the Russian people.

1. Weak and small.
2. Can do more work than Americans.
3. Very sad and do not enjoy dancing and singing.
4. Big and strong.
5. Polite and friendly.

STUDY SHEET X

Today we continue our study of the Great Plain of Europe, particularly the country of Russia. The lesson includes sections 475 through 480, pages 244–246. Read these sections through twice and then see how many of the questions below you can answer. After you have answered all you can, open your books and find the answers to the other questions.

I. Fill in the blank spaces.
The Great Plain is nearly ..... of Europe.
It has about as many people as .....

II. Underline the best reason for the lack of manufacturing on the plain.

1. No raw materials.
2. Backwardness of the people.
3. Long, cold winters.

III. Cross out the wrong words.

Most of the manufacturing in Russia is done {in factories / in the homes} during the {winter / summer}. Factories have been built {only recently / for a long time} on the plain.

Most Russian factories before the war were owned by {foreigners / Russians}.

IV. Write first one important fact about each city, and then two products it manufactures.

Warsaw..... 1. .....
2. .....
Moscow ..... 1. .....
2. .....

V. Underline the statements below which describe the Russian people.

1. Live chiefly through agriculture.
2. Prosperous.
3. Educated.
4. Poor.
5. Live through manufacturing.
6. Ignorant.

VI. Underline the chief articles of food of the Russian people.

Wheat bread	Cabbage
Mutton	Eggs
Rye bread	Potatoes

VII. Look at the wheat map on page 206, and notice the great Russian wheat region. To what part of North America is the climate similar?

.....

There are two times for planting wheat. Put the right one after the section where it is practised.

1. Near the Black Sea. .....
2. East of the Black Sea. .....

VIII. Underline the best reason why the Russian yield of wheat is not so great as the German.

1. The farmers of Russia are too ignorant to cultivate well.
2. Soil of Russia is not so good as that of Germany.
3. The peasants live in poor houses.

IX. Write the material from which the various parts of the Russian houses are made.

1. Walls	3. Roof .....
2. Plaster	4. Floor .....

X. Underline the number of Russians and Poles who used to leave their homes to help in harvests elsewhere.

1,000
100,000
1,000,000
5,000,000

XI. Underline the best title for section 478.

1. Harvesting wheat in Russia.
2. Why the Poles harvest German wheat.
3. How the Poles and Russians used to leave their homes to harvest wheat elsewhere.

XII. There are three chief ways of sending surplus food out of Russia. Write below after each section named the way the food is shipped. Then write after sections 1 and 3 one city that is the center for trade in that section.

1. North Section	.....
2. Central Section	.....
3. Southern Section	.....

XIII. Underline the best definition of a central European fair.
1. A market at which home-made goods are exchanged for manufactured goods.
2. A public celebration at which all the people put on their best clothes and have a good time.

XIV. Underline the best reason why fairs are not so important as formerly.
1. The building of railroads.
2. The people have become tired of them.

XV. Underline the best prospects for the future on the great plain.
1. More food production in the western part.
2. More food production in Poland and Russia.
3. Mining in Russia.
4. Manufacturing in Russia.
5. Commerce and trade in Russia and Poland.

TEST V

Put a T before each true statement and an F before each false one.

..... 1. The Central Plain is an important part of Germany.
..... 2. The soil on the plain was originally very fertile.
..... 3. The treatment of the soil has exhausted it.
..... 4. Germany has encouraged education.
..... 5. The Germans made great progress in science.
..... 6. Germany has had many famous musicians.
..... 7. Lack of coal prevented manufacturing in Germany.
..... 8. Most of the people in Berlin own their homes.
..... 9. The German trade was the result of careful study of other countries.
.....10. Little attention was paid to transportation by water.
.....11. Poland has always been an independent country.
.....12. Education is poor in the New Baltic States.
.....13. The people of Poland are not intelligent.
.....14. The Russians have had little opportunity for education.
.....15. Before the World War, few Russians owned their land.
.....16. The Russian villages are very attractive.
.....17. The Russians farm very intelligently.
.....18. After the World War the land was given to the Russian peasants.
.....19. The Russians are fond of music.
.....20. The Danish people have had more opportunities than the Russians.
.....21. There is little factory work in Russia because there are so few people.
.....22. Lack of transportation has hindered Russia's progress.

.....23. There is no coal in Poland.
.....24. Most of the Russian factories were run by foreigners before the war.
.....25. The Russians manufacture many articles by hand.
.....26. Russia has one of the greatest wheat fields of the world.
.....27. The wheat fields of Russia have fine rich soil.
.....28. Much machinery is used in Russian farming.
.....29. The people of Russia are very poor.
.....30. Wheat is practically the only crop raised in Russia.
.....31. Most of the wheat is used by the Russians.
.....32. Odessa is a great wheat port.
.....33. Many Poles used to go out of their own country to work.
.....34. Many cities in Europe were started by fairs.
.....35. These fairs were held several times a year.
.....36. The question of transportation has no effect on these fairs.
.....37. This region imports most of its machinery.
.....38. In the western part of this plain much more food could be raised.
.....39. Russia and Poland could raise much more food.
.....40. Lack of coal and iron prevents manufacturing in Russia.

STUDY SHEET XI

Great Northern Forests of Europe

Look at the map of page 204 and find section F in the northern part of Europe. Is it high land or low land?.....What grows there chiefly?.....Read sections 481 through section 487, pages 247 to 248 very carefully. Then see how many of the questions below you can answer without looking at the book. After you have answered all you can, find the answers to the others in your book.

I. Where is the region in North America which is like the Great Forest section of Europe? .....
Name the two chief countries south of this region in North America.
1..... 2.....

II. There are two parts to this belt, a treeless zone of frozen tundra and a belt of trees. Which is farther north?.....What kinds of trees grow there?.....

III. Cross out the wrong statement.
This belt runs only across Europe.
This belt runs across both Europe and Asia.

IV. Underline the reason for bogs and lakes in this section.
1. The great glacier.
2. The low land.
3. Frequent rains.

V. Underline the kinds of animals found in the forests. Underline twice the two which furnish men with something useful. Write what that thing is in space below the names of the animals.

lions	elephants	wolves
bears	wild boars	leopards.

.....

VI. Underline the chief point of difference between the European Forest Belt and the American Forest Belt.

1. The people do not kill the same animals.
2. The people do not eat the same kinds of food.
3. In Europe some of the land has been prepared for farming.

VII. Underline the two chief occupations of the men of the northern forest.

Lumbering	Hunting	Manufacturing
Fishing	Farming	

VIII. Cross out the wrong words.

The logs are carried out of the woods by $\left\{\begin{matrix}\text{streams}\\\text{railroads}\end{matrix}\right\}$.

In the $\left\{\begin{matrix}\text{spring}\\\text{summer}\end{matrix}\right\}$ these logs are shipped all over Europe.

IX. Write below the three ways in which the lumber is used in Europe.

1. .....
2. .....
3. .....

X. Underline the best title for section 484.

1. Logging by rafts in Europe.
2. How lumber is sent down the Volga River.
3. Transportation of lumber on the European plain.

XI. Write below in the first space the name of the most important metal produced in the great forest section of Europe. Write in the next spaces the two countries which chiefly import it. In the next spaces write the names of the two bodies of water over which it is carried in boats. The words "winter" and "summer" will tell you in which space to write each body of water. You will need to look at the map on page 204 and find *Narvik* in Norway to answer the last part of this question.

..... Winter .....

.....

..... Summer.....

XII. Underline the best reason why the port of Narvik is open while the ports of Lake Superior in the United States are closed in the middle of winter.

1. Narvik is farther north.
2. Lake Superior is farther north.
3. Warm ocean currents.

XIII. Write in the first space below the name of the other mineral product of this region. Write in the next space the proportion of the world's supply which used to be produced here. Write in the last two spaces the uses to which this product is put.

....

XIV. Underline the best hope for the future in this region.
1. Farming.
2. Manufacturing many products.
3. Forestry.

STUDY SHEET XII

Arctic Pastures

Look at the map on page 204, and find section G. It is in the very northernmost part of Europe and is a very interesting region. Read sections 488 through 491, page 291–250. Read these through carefully and then see how many of the questions below you can answer. After you have answered all you can, turn to the book and find the answers to the other questions.

I. If you were in the European Tundra Region, how could you tell that you were in Europe and not in North America? .....

II. Write below the parts of the reindeer's body which are particularly well suited to the climate in which it lives. Write after the first part two ways in which it helps the reindeer.

1. ..... 1. .....
2. ..... 2. .....

III. Below is an outline for the facts about the Laps. Fill in the blank spaces.
1. Color .....
2. Where they came from .....
3. Homes .....
4. Property .....
5. Uses of reindeer.
   a. .....
   b. .....
   c. Furnish owners 1. .....
   2. .....
   3. .....
   4. .....

IV. Underline what will probably happen in this region in the future.
1. Become an agricultural country.
2. Become a manufacturing country.
3. Little change likely.

V. Turn to the map on pages X and XI in the front of your book and find Spitzbergen. Fill in the blank spaces.
Spitzbergen is ..... miles north of Norway and is about

the size of ..... Harbors in the southwestern part of this region are open from ..... to ..... which is about ..... months.

Before the War this country was visited chiefly by ..... who sometimes stayed to hunt .... and .....

VI. Underline the chief use at present for Spitzbergen.
1. Summer resort.
2. Coal field.
3. Manufacturing center.

VII. What country now owns the coal mines? ..... About how many days are there in Spitzbergen which are dark all day? ..... About how many each year when it is light all day? .....

VIII. Look at question 5 in the second column on page 250. Write three answers to it below.
1. .....
2. .....
3. .....

TEST VI

Put a T before each true statement and an F before each false one.

..... 1. The extreme northern part of Europe is like that of North America.

..... 2. The belt of evergreen forest reaches only from the Scandinavian Mountains to the Ural Mountains.

..... 3. All of this northern part is mountainous.

..... 4. There are many swamps and lakes in this section.

..... 5. There are more people in the northern forests of Europe than in those of North America.

..... 6. There are no animals in these forests.

..... 7. The farmers work in summer and rest in winter.

..... 8. These men make all of the living by farming.

..... 9. The rivers are valuable to the lumbermen.

.....10. They build canals around the waterfalls.

.....11. The lumber is sent to many parts of Europe.

.....12. The ships carry lumber winter and summer.

.....13. The Volga is an important waterway.

.....14. Sweden has great iron mining districts.

.....15. This iron cannot be shipped in winter.

.....16. Nine tenths of the world's platinum has come from the Ural mountains since the World War.

.....17. Platinum is heavier and more costly than gold.

.....18. The Finns are intelligent and well educated.
.....19. Finland was formerly governed by Russia.
.....20. This section seems likely to increase rapidly in wealth and population in the future.
.....21. The treeless tundra is just south of the evergreen forests.
.....22. This tundra is similar to that in North America.
.....23. The reindeer's hoof is suited to the ground here.
.....24. The reindeer moves south to a warmer climate in the winter.
.....25. The people in Lapland are white.
.....26. The reindeer furnish food and clothing for the Laps.
.....27. The Laps first lived in Asia.
.....28. The Laps build attractive houses.
.....29. The reindeer farmers in Alaska were taught by Laps.
.....30. The tundra could feed many more reindeer.
.....31. The finding of minerals in this section might change it considerably.
.....32. The warm ocean currents aid transportation to Spitzbergen.
.....33. Most of the islands of Spitzbergen are covered with glaciers the year round.
.....34. Fur-bearing animals are found in Spitzbergen.
.....35. Norway owned the islands until 1919.
.....36. Large deposits of coal are found in Spitzbergen.
.....37. The mines in Spitzbergen are worked only in summer.
.....38. The mines are lighted by electricity.
.....39. During the two months in summer there is no sunset.
.....40. Coal was only recently discovered on this island.

II

STUDY QUESTIONS BASED ON *ADVANED GEOGRAPHY* BY FRANK M. McMURRY AND A. E. PARKINS

THE CHINESE REPUBLIC

Its Chief Divisions

I. The first paragraph states that the four dependencies of China contain two thirds of the area of the entire republic. Write the names of the four dependencies in the spaces on the left below. Write in the next space the population of each. Add the populations. Then see what part of the total population of the Chinese Republic is made up by the four dependencies.

1. ....
2. ....
3. ....
4. ....

Total

The total population of the four dependencies is about
(Underline the correct one)
one half
one third
one sixth
one twelfth

II. Underline the two reasons for the small population of the four dependencies of China.

1. There are few people there.
2. Too high and cold.
3. Too dry.
4. Not many agricultural crops raised.

III. Underline the rivers which rise on the borders of Tibet.

Ganges	Lena	Irrawaddy
Yangtse	Indus	Mekong
Hwang	Tigris	Euphrates.

IV. Write below the name of the kind of animal herded by the nomads of China's dependencies, which we do not have in the United States. Then underline in the next column the name of the animal which it is most like.

	Camel
.....	Cattle
	Sheep
	Goats
	Horses

V. Underline the reason why Southern Manchuria is unlike the rest of the Chinese dependencies.
1. It is farther south.
2. It is good for agriculture.
3. It is much larger.

VI. The line numbered 1 below represents the size of China proper. Measure this line and then draw a line at the place marked 2 which will represent the size of the United States.
1. .....
2.
The line marked 3 represents the population of China. Measure it and then draw a line at 4 which is the right length to represent the population of the United States.
3. .....
4.

VI. Underline the phrase which best expresses the history of China to date.
1. Slow, gradual, continuous progress.
2. Great progress in early history and little in later history.
3. Very fast progress both in early and late history.

Favorable Conditions for Agriculture

VII. Below are written the conditions which are unfavorable to agriculture. Underline either or both, according to whether they can be remedied be man, and write opposite those that you underline how they may be overcome.
1. Mountain slopes .....
2. Dry parts of country .....
3. Highlands. .....

VIII. Cross out the wrong words.
The temperature and rainfall of China are {unfavorable / favorable} to agriculture. Long droughts like those in India are {frequent / infrequent}. The soil as a rule is {rich / barren}.

Favorable Conditions for Manufacturing

IX. Write below the names of the two minerals which we always think of in connection with manufacturing. If they are found in large quantities in China, write "Yes" in the next space. In the spaces below, write the names of four other minerals found in China.
1. ....
2. ....
1. .....
2. .....
3. .....
4. .....

Reasons for Lack of Progress

On pages 413, 414 and 415 are given the reasons for the backward condition of China. Read this section through carefully, with this question in mind: What changes must take place in China to make her thoroughly progressive? Then answer the questions below.

I. Below are written the two ways which a country uses to communicate with other countries. After these are blank spaces. In the blank space after each way, write the reason why China has used that way so little. A number of possible reasons are given below. Be sure to select the best one before you write it in the blank space.

1. By land .....
2. By sea .....

Reasons.

Pacific Ocean little used until modern times.
Lack of sail boats.
Lack of ocean vessels.
Long, difficult and dangerous routes.
People do not like land travel.

II. Write on the first space below the amount of mileage of railroad in China. Write in the second space the amount of mileage in the United States. Is there much difference? ..... (Write yes or no.) Which has the larger area, the United States or China?
....

III. There are two kinds of boats in the picture on page 413. Write their names below. In the third space, write the name of the kind of boats which are used on the Yangtze but which are not shown in the picture.

1 .....
2 .....
3 .....

IV. Does the amount of river traffic in the picture look as though there was little river traffic? ..... Is the river traffic comparatively small? .....

V. If it started at New York and extended west, to what great city would the Grand Canal reach? .....

VI. The pictures in this chapter show two methods of overland transportation. Write them here. 1 .....
2 .....

Underline the best reason below why automobiles are not used.

1. Automobiles are too expensive.
2. The Chinese do not like new things like automobiles.
3. The roads are not wide enough or good enough in the country for automobiles.

VII. Underline the *two* best reasons why ancestor worship does not make for progress.

1. It teaches children to respect their parents.

2. It sets too great value on the past.
3. It makes foreigners unwelcome.
4. It was taught by Confucius.

VIII. Underline the best reason why the character of China's government hindered the progress of the people.
1. The tribes of the northwest conquered the peace-loving Chinese.
2. The conquerors were herdsmen and distrusted European manufacturing and inventions.
3. The Great Wall had to be built to keep out invaders.

Recent Promising Changes

I. Underline the correct answer.
The old government of China was overthrown and a republic established.
1. Five years before the World War.
2. Two years before the World War.
3. At the time of the beginning of the World War.

II. Underline the best reason for the quarrels between sections of China since the establishment of the republic.
1. There are too many people in China.
2. The Chinese are largely an agricultural nation.
3. Most of the people are too ignorant to make intelligent citizens in a democracy.

III. Underline the best reason why the location of Pekin is an unfortunate one for the capital of China.
1. It is too far from the center of the country.
2. It is near the sea coast.
3. It was the capital of the old monarchy.

IV. Underline the two means of transportation which have been most improved in China.
1. Railroads
2. Canals
3. Rivers
4. Roads
5. Aeroplanes

V. Cross out the wrong words.
{Many / Few} Chinese are now studying in foreign countries.
Their reason for this is to learn from other countries for {the benefit / the benefit} of these countries / of China.

How so Great a Population Has Been Able to Support Itself by Agriculture

VI. How many times as large as the average Chinese farm is the average American farm?..... Underline the best definition of intensive farming.

1. A farm where the people work intensely hard.
2. A small area is made through careful cultivation to yield large crops.
3. A farm which is large and fertile.

VII. Cross out the wrong words.

In China {two or three / four or five} crops a year can be raised.

The work is done by {farm machinery / hand}.

VIII. Agriculture (except for the slight amount done by the Indians) has been carried on in this country for about four centuries (444 years). In China it has been carried on for over forty centuries (4000 years). How many times as long in China as in America? .....
In which country is the soil as a whole in better condition at the present time? .....

IX. Underline the best reason why soil at the bottom of rivers and canals in China is good soil.

1. It is moist from the river and canal water.
2. It has been carried by the water from mountain districts which have never been farmed.
3. It is soft and not mixed with rocks.

X. Fill in the blank spaces.

Three ways of saving rain water.

1. ..... the fields. 2. ..... the hillsides. 3. Planting in ridges with ..... between to hold the water.

XI. Underline the best title for the first two paragraphs in the section 416.

1. How the Chinese use for fertilizer everything that has value for the soil.
2. How the Chinese make and use compost stacks.
3. The use of ashes and manure for fertilizer.

XII. Nitrogen helps in the growth of plants. Put the figure 1 in front of the crops below which take nitrogen from the soil, and the figure 2 before those which help to put it back.

Rice
Clover
Soy beans
Barley

Arrange in two columns the crops listed below, putting opposite one crop a crop which puts back into the soil what the first one takes out.

Mulberry orchards Barley Soy beans Rice Clover

1.	4. .....
2.	5. .....
3.	6. .....

The Great Variety of Agricultural Products

I. Arrange in the two columns the food products of China. Be sure to put each food product under its proper heading.

Vegetable				Animal	
1.	6.		1.		
2.	7.		2.		
3.	8.		3.		
4.	9.				
5.					

Now underline the two most important vegetable products and the one most important animal product. Write an N before the vegetable products raised in the north and an S before those which are raised farther south.

II. The United States is about 150 years old. China has been famous for one product for 2000 years. Write the name of the product here .... About how many times as long as the United States has existed has that product been cultivated in China? ..... Another geography gives the following figures for the world's production of raw silk.

Japan	48,800,000 pounds
China	42,800,000 pounds
Italy	4,000,000 pounds
Levant	2,200,000 pounds
France	300,000 pounds
Total	pounds

Add these figures. Notice the per cent of raw silk which China produces according to your book. Write it here ..... From the table above, does this look correct?.....

III. Look at the picture on page 417. What are the man's trousers probably made of?.....Was the raw material for them probably raised in China?.....

IV. Cross out the wrong words.

China is {like / unlike} the United States because it is {easy / hard} to get from one part of the country to another. Transportation in China is {hard / easy} and in the United States it is {easy / hard}. This leads in China to {comfort / famines}.

Danger Threatening China from Other Nations

V. Judging from page 418, which nation has done China the greatest harm in taking her land?.....Write on the left below the cities in

China which are held in whole or part by other nations and on the right the names of provinces or districts of which the same is true.

Cities		Provinces or Districts.
1.	4.	1. .....
2.	5.	2. .....
3.	6.	3. .....

Below are the advantages which other nations hope to get from China and also the advantages which China will receive from other nations. Arrange these in the blank columns *under the correct heading.*

1. Great mineral resources.
2. Immense trade.
3. More employment.
4. Higher standard of living.
5. Railroad concessions.
6. Cleaner and more sanitary cities.

Advantages for China.	Advantages for Other Nations.
1.	1. .....
2.	2. .....
3.	3. .....

SIBERIA

There are two distinct parts of Siberia. The one consists of the southwestern part and is described on page 398. It is quite different in climate and resources from the great northern part of the country.

I. The area of the United States is about 3,000,000 sq. miles. About how many square miles in the region described on page 398? .....

II. The climate here is much like that of two other countries nearby. Which direction from this region are these two countries? .....
.....

III. Turn to the map on page 17 and find the amount of annual rainfall in southwestern Siberia. Write it here .....

IV. Underline the best reason why grazing leads to a nomadic life.
1. Animals soon eat up all of the grass and their owners have to move on.
2. People whose chief industry is grazing like to move around freely.
3. Grazing does not require the erection of permanent buildings as manufacturing does.

V. Underline the best answer.
An oasis is
1. A barren spot in the desert.
2. A great river.
3. A place in the desert where there are springs of water.

VI. Underline the best reason why rugs are the chief manufactured articles of this region.
1. The people have plenty of time to weave the rugs.

2. Grazing being the chief industry, there is plenty of wool from the sheep, and rugs are made from wool.
3. Primitive people like to weave better than they like to do anything else.

VII. Put the word "Into" before the products below which are probably shipped into Siberia and word "Out" before the products which you think are shipped out of Siberia.

.....1. Rugs	.....4. Wheat
.....2. Wool	.....5. Dates
.....3. Cotton cloth	.....6. Metal tools

VIII. Fill in the blanks below from the tables on page 477.

	Area	*Population*
Siberia	.....	.....
Canada	.....	.....
United States	.....	.....

Look at these facts and then answer the questions below.

1. About how many times as large as the area of the United States are the combined areas of Canada and Siberia? .....
2. About how many times as great as the combined populations of Canada and Siberia is the population of the United States? .....
3. Underline the best reason for (2) above.
   a. United States has a better climate and better resources than either Canada or Siberia.
   b. United States is an older country than either of the others.
   c. United States is more progressive than Canada or Siberia.

IX. Write an F before the products below which are raised in the Siberian forest and an A before the products which are raised in the agricultural plain around Tomsk.

Wheat	Coffee	Rice
Cotton	Furs	Tobacco
Corn	Butter	Timber

X. Underline the minerals found in Siberia. Underline twice those two that are most important for manufacturing.

Coal	Copper	Lead
Diamonds	Tin	Silver
Iron	Zinc	Graphite

XI. Underline the industries that furnish the best prospects for the future of Siberia.

1. Agriculture.
2. Manufacturing textiles.
3. Manufacturing iron products.
4. Commerce and trade.
5. Grazing.
6. Manufacturing small articles like watches and jewelry.

INDIA

Why Industries in India Have Made Slow Progress

I. Underline the *two* best reasons why industries in India have made slow progress.
   1. India was too prosperous during the Middle Ages.
   2. The religion of India encourages ignorance in the great mass of people.
   3. The people of India are not interested in manufacturing for the people of other countries.
   4. The people of India hoard their money instead of investing it.

II. Write the word "India" before the statements below which tell what the people in India do with their money; and the words "United States" before statements which tell what the people in the United States do with their money.

..... 1. Hoard the money.
..... 2. Build palaces.
..... 3. Melt gold into bars and hide them.
..... 4. Invest money in mines and factories.
..... 5. Purchase elephants for mere display.
..... 6. Build railroads.

III. Underline the chief industry of India.

Mining	Agriculture	Fishing
Grazing	Dairying	Lumbering

How so Great a Population Attempts to Make a Living Through Agriculture

I. Underline the correct statement.
   1. India covers more degrees of latitude than the United States.
   2. India covers fewer degrees of latitude than the United States.

II. Underline the *two* best reasons why there is a wide variety of climate in India.
   1. There is a great range of latitude in India.
   2. Many different agricultural products are produced there.
   3. The surface of the country varies greatly in altitude.
   4. India is very densely populated.

III. Arrange the three altitude levels below in their proper order from North to South. That is, write in space (1) the level farthest north, in space (2) the next south, and in space (3) the level farthest south.

a. Broad, flat plain.	1. .....
b. Lofty mountains.	2. .....
c. Plateau 2000 feet high.	3. .....

IV. Below you will find the names of India's agricultural products on the left side of the paper; and opposite them, certain statements about them. Some of these statements are true and some are not. Cross out the ones which *are not* true.

Wheat	Raised in northeastern part of country.
	Raised in northwestern part of country.
	Not grown extensively.
	Grown extensively.
Rice	Raised in northwestern part of country.
	Raised in northeastern part of country.
Millet	Is an important product.
	Is not an important product.
Sugar Cane	Little grown in India.
	Most extensively grown of any place in the world.
Tea	Grown in northeastern India.
	Grown in Ceylon.
	Requires cheap hand labor.
Cotton	Grown in western part of India.
	Grown in central part of India.
	Superior to that grown in United States.
	Exported to Great Britain.
	Inferior to that grown in United States.

V. Write in the spaces below three other agricultural products of India.
1. .....
2. .....
3. .....

VI. Underline the things about agriculture that the people of India understand well. Cross out the things about which they know little or nothing.
1. Rotation of crops.
2. The use of tractors for plowing.
3. The use of farm machinery.
4. Adaptation of crops to soil and climate.

VII. The average farm in America is 130 acres. The average farm in Europe is 14 acres. Is the average farm in India larger or smaller than that in America? ..... Is it larger or smaller than the average in Europe? .....

VIII. Cross out the wrong words.
The chief animals used in India for farm work are:

Donkeys
Horses
Cattle
Water buffaloes

IX. Write the words "wet" or "dry" after the monsoon to which they belong. Then write in the next space the products which are raised when that wind is blowing.

Summer Monsoon.....	1. .....
	2. .....
Winter Monsoon	1. .....
	2. .....

X. How many crops a year are raised in India, dependent on the two monsoons? .....

Why India Has Been a Land of Many Famines

I. Underline the best general reason for famines in India.
   1. Large number of people.
   2. Failure of crops.
   3. Ignorance of people.

II. Cross out the wrong words.
   The rainfall in India is {regular / irregular}. This means that a {small / large} part of the water can be used for agriculture.

III. The rainfall in New York is about forty inches. About how many times as great is the rainfall in the Himalaya Mountains?.....

IV. Underline the name of the monsoon which may fail and bring on crop failure.
   Winter Monsoon.
   Summer Monsoon.

V. Underline the best reason why railroads have helped in times of famine.
   1. The people can get away from famine country.
   2. The railroads mean great civilization of the people.
   3. The railroad can bring food to the famine sufferers.

VI. Write below the two sources of water for irrigation in India.
   1. .....
   2. .....
   Has India a greater or less tract of irrigated land than United States?
   .....

How the British Came into Possession of the Indian Empire

I. Underline the sentence which tells best why Great Britain took over the control of India.
   1. Great Britain sent out an army and conquered India.
   2. The British did not like to see so many rulers in the country.
   3. British traders induced England to take India to protect their interests and to settle disputes.

II. The area of New York State is about 50,000 square miles. Is the area of the largest territory ruled over by one ruler in India larger or smaller than the area of New York State? .....

III. Write the names of the four chief parts of the Indian Empire.
   1. ..... 3. .....
   2. ..... 4. .....

IV. Write below the names of the four chief cities of India. Underline those that you think are probably engaged in shipping Indian products to Europe.
   1. ..... 3. .....
   2. ..... 4. .....

III

STATISTICAL TABLES

HOW TO READ THE TABLES

In the left hand columns of the tables are given the results of the tests of groups using the study question method; in the right hand columns, the results from the control groups. In all tables except summaries, the number of pupils is given first. Then follows the mean, or arithmetical average, of the group in the true-false test.

The SD_m or standard deviation of the mean is a measure of variability. It is obtained by dividing the standard deviation of the distribution by the square root of the number of cases.

The SD_{S1} is the standard deviation of the sum, for the experimental groups. It is obtained by squaring both of their SD_m's and extracting the sauare root of the sum. The SD_{s2} is the same measure for the control groups.

To find the E.C., or experimental coefficient, the sum of the means of the control groups is subtracted from the sum of the means of the experimental groups. The number thus obtained (D) is divided by 2.78 times the SqD_d.[1]

The summary tables are to be read in the same way as the above except, that in them the SD or standard deviation is given. This is the square root of the mean squared deviations of the scores from their mean.

Note. The distribution tables upon which the calculations in the following tables were based may be obtained from the author by any student of education who desires to check the computations.

TABLE I

EXPERIMENTS AT SPEYER SCHOOL
FIRST TWO WEEKS

Group	Study Question Method	Group	Control Method
A	Number ..... 23.00 Mean ..... 11.34 SD_M 1.22	B	Number ..... 23.00 Mean ..... 8.13 SD_M 1.53
B	Number ..... 23.00 Mean ..... 12.65 SD_M 1.73	A	Number ..... 23.00 Mean ..... 9.00 SD_M 2.09

Difference .. 6.86 SD_{S1} ..... 2.11 SD_{S2} ..... 2.77 SD_D 3.34
E. C. = 6.86 ÷ 9.28 = .739

[1] McCall, W. A., *How to Experiment in Education*, Chap. VIII.

TABLE I (*Continued*)

SECOND TWO WEEKS

Group	Study Question Method	Group	Control Method
A	Number ..... 27.00 Mean ..... 12.96 SD_M 1.41	B	Number ..... 22.00 Mean ..... 12.45 SD_M 2.06
B	Number ..... 22.00 Mean ..... 14.68 SD_M 1.81	A	Number ..... 27.00 Mean ..... 13.63 SD_M 1.13

Difference .. 1.56 SD_{S1} ..... 2.29 SD_{S2} ..... 2.35 SD_D 3.28
E. C. = 1.56 ÷ 9.11 = .17

THIRD TWO WEEKS

Group	Study Question Method	Group	Control Method
A	Number ..... 25.00 Mean ..... 16.72 SD_M 1.10	B	Number ..... 26.00 Mean ..... 15.30 SD_M 1.44
B	Number ..... 26.00 Mean ..... 20.42 SD_M 1.60	A	Number ..... 25.00 Mean ..... 9.28 SD_M 1.58

Difference . 12.56 SD_{S1} ..... 1.94 SD_{S2} ..... 2.14 SD_D 2.88
E. C. = 12.56 ÷ 8 = 1.57

TABLE II

SUMMARY—SPEYER SCHOOL

Study Question Method		Control Method	
Mean 1	13.72	Mean 2	12.09
Mean 4	16.12	Mean 3	10.76
SD_1	6.53	SD_2	8.50
SD_4	8.81	SD_3	8.11
SD_{M1}	.75	SD_{M2}	1.00
SD_{M4}	1.04	SD_{M3}	.93

SD_{S1}	1.28
SD_{S2}	1.36
Difference	6.99
SD_D	1.87
Experimental Coefficient	1.34

TABLE III

RETESTS AT SPEYER SCHOOL

FIRST TWO WEEKS

Group	Study Question Method	Group	Control Method
A	Number ..... 23.00 Mean ..... 10.23 SD_M 1.36	B	Number ..... 23.00 Mean ..... 8.39 SD_M 1.18
B	Number ..... 23.00 Mean ..... 7.30 SD_M 1.56	A	Number ..... 23.00 Mean ..... 6.82 SD_M 1.56

Difference .. 2.32 SD_{S1} ..... 2.07 SD_{S2} ..... 1.95 SD_D 2.84

E. C. = 2.32 ÷ 7.89 = .29

SECOND TWO WEEKS

Group	Study Question Method	Group	Control Method
A	Number ..... 27.00 Mean ..... 10.63 SD_M 1.92	B	Number ..... 22.00 Mean ..... 10.18 SD_M 1.60
B	Number ..... 22.00 Mean ..... 8.45 SD_M 1.54	A	Number ..... 27.00 Mean ..... 9.48 SD_M 1.62

Difference .. −.58 SD_{S1} .... 2.45 SD_{S2} ..... 1.78 SD_D 3.35

E. C. = −.58 ÷ 9.31 = −.06

THIRD TWO WEEKS

Group	Study Question Method	Group	Control Method
A	Number ..... 25.00 Mean ..... 15.84 SD_M 1.68	B	Number ..... 26.00 Mean ..... 12.30 SD_M 1.78
B	Number ..... 26.00 Mean ..... 8.61 SD_M 1.46	A	Number ..... 26.00 Mean ..... 5.40 SD_M 1.37

Difference .. 6.80 SD_{S1} ..... 2.22 SD_{S2} ..... 2.24 SD_D 3.16

E. C. = 6.80 ÷ 8.78 = .77

TABLE IV

SUMMARY—RETESTS AT SPEYER SCHOOL

Study Question Method		Control Method	
Mean 1	12.25	Mean 2	10.38
Mean 4	8.14	Mean 3	7.30
SD_1	8.60	SD_2	7.64
SD_4	7.20	SD_3	7.68
SD_{M1}	.99	SD_{M2}	.90
SD_{M4}	.85	SD_{M3}	.88

SD_{S1}	1.30
SD_{S2}	1.26
Difference	2.71
SD_D	1.81
Experimental Coefficient	.538

TABLE V

EXPERIMENTS AT PUBLIC SCHOOL 43

FIRST TWO WEEKS

Group	Study Question Method	Group	Control Method
A	Number 15.00 Mean 14.53 SD_M 1.93	B	Number 15.00 Mean 9.6 SD_M 2.45
B	Number 15.00 Mean 11.33 SD_M 2.19	A	Number 15.00 Mean 9.6 SD_M 1.41

Difference .. 6.66 SD_{S1} ..... 2.92 SD_{S2} ..... 2.83 SD_D 4.06

E. C. = 6.66 ÷ 11.28 = .59

SECOND TWO WEEKS

Group	Study Question Method	Group	Control Method
A	Number 16.00 Mean 18.00 SD_M 1.71	B	Number 15.00 Mean 11.26 SD_M 1.82
B	Number 15.00 Mean 11.86 SD_M 2.37	A	Number 16.00 Mean 12.00 SD_M 2.02

Difference .. 6.60 SD_{S1} ..... 2.92 SD_{S2} ..... 2.72 SD_D 3.99

E. C. = 6.60 ÷ 10.09 = .65

TABLE V (*Continued*)

THIRD TWO WEEKS

Group	Study Question Method	Group	Control Method
A	Number ..... 15.00 Mean ..... 15.46 SD_M 1.89	B	Number ..... 15.00 Mean ..... 13.46 SD_M 1.44
B	Number ..... 15.00 Mean ..... 15.73 SD_M 1.91	A	Number ..... 15.00 Mean ..... 15.73 SD_M 2.26

Difference .. 2.00 SD_{S1} ..... 2.68 SD_{S2} ..... 2.68 SD_D 3.79
E. C. = 2.00 ÷ 10.53 = .19

TABLE VI

SUMMARY
EXPERIMENTS AT PUBLIC SCHOOL 43

Study Question Method	Control Method
Mean 1 ..... 16.04 Mean 4 ..... 12.97	Mean 2 ..... 11.44 Mean 3 ..... 12.43
SD_1 ..... 6.89 SD_4 ..... 8.05	SD_2 ..... 7.19 SD_3 ..... 7.50
SD_{M1} ..... 1.01 SD_{M4} 1.20	SD_{M2} ..... 1.07 SD_{M3} 1.10

SD_{S1} 1.57
SD_{S2} 1.53
Difference 5.14
SD_D 2.19
Experimental Coefficient ..... .84

TABLE VII

EXPERIMENTS AT ROSELLE, PASSAIC AND STAMFORD
ROSELLE

Group	Study Question Method	Group	Control Method
A	Number ..... 34.00 Mean ..... 19.14 SD_M 1.12	B	Number ..... 16.00 Mean ..... 18.06 SD_M 1.19
B	Number ..... 16.00 Mean ..... 25.31 SD_M 1.13	A	Number ..... 34.00 Mean ..... 20.17 SD_M 1.14

Difference .. 6.22 SD_{S1} ..... 1.59 SD_{S2} ..... 1.64 SD_D 2.29
E. C. = 6.22 ÷ 6.36 = .978

TABLE VII (*Continued*)

PASSAIC

Group	Study Question Method	Group	Control Method
A	Number ..... 34.00 Mean ..... 19.79 SD_M 1.42	B	Number ..... 28.00 Mean ..... 23.25 SD_M 1.15
B	Number ..... 28.00 Mean ..... 27.07 SD_M 1.01	A	Number ..... 34.00 Mean ..... 23.52 SD_M 1.40

Difference.... .09 SD_{S1} ..... 1.74 SD_{S2} ..... 1.81 SD_D 2.51
E. C. = .09 ÷ 6.97 = .013

STAMFORD

Group	Study Question Method	Group	Control Method
A	Number ..... 20.00 Mean ..... 15.50 SD_M 1.97	B	Number ..... 28.00 Mean ..... 7.46 SD_M 1.29
B	Number ..... 28.00 Mean ..... 15.46 SD_M 1.18	A	Number ..... 20.00 Mean ..... 11.70 SD_M 1.97

Difference . 11.80 SD_{S1} ..... 2.29 SD_{S2} ..... 2.35 SD_D 3.28
E. C. = 11.80 ÷ 9.11 = 1.29

TABLE VIII

SUMMARY
ROSELLE, PASSAIC AND STAMFORD

Study Question Method		Control Method	
Mean 1	18.56	Mean 2	15.95
Mean 4	22.16	Mean 3	19.54
SD_1	7.91	SD_2	9.48
SD_4	7.64	SD_3	8.95
SD_{M1}	.84	SD_{M2}	1.11
SD_{M4}	.90	SD_{M3}	.95

SD_{S1}	1.23
SD_{S2}	1.28
SD_D	1.90
Difference	5.23
Experimental Coefficient	.99

TABLE IX

SUMMARY OF ALL EXPERIMENTS

Study Question Method		Control Method	
Mean 1	16.22	Mean 2	13.58
Mean 4	17.68	Mean 3	14.82
SD_1	7.54	SD_2	8.68
SD_4	9.01	SD_3	9.30
SD_{M1}	.52	SD_{M2}	.63
SD_{M4}	.65	SD_{M3}	.64

SD_{S1}	.0832
SD_{S2}	.0898
SD_D	1.22
Difference	5.50
Experimental Coefficient	1.62

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